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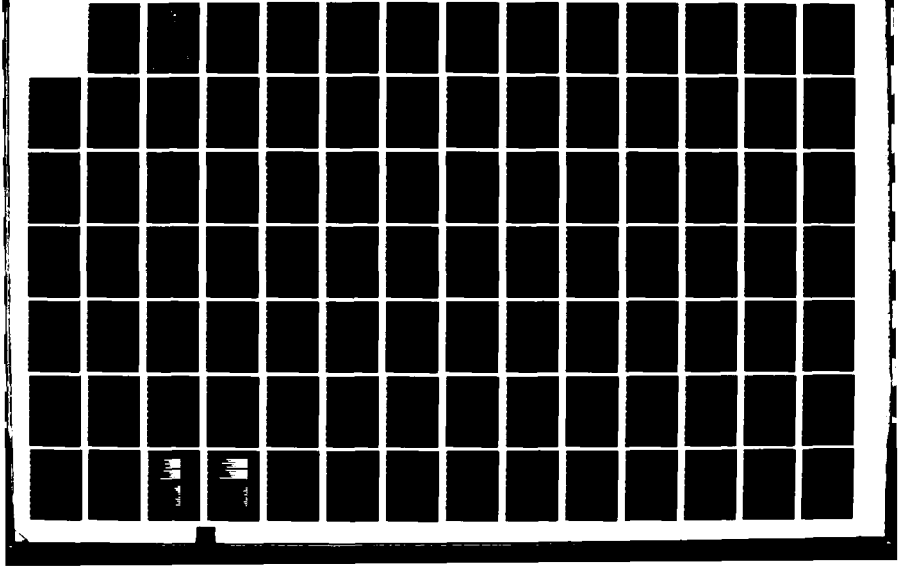

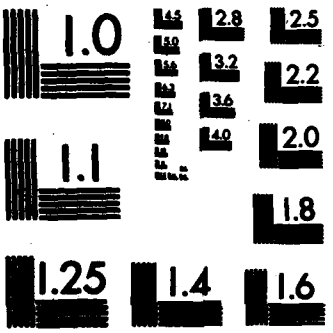

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A SURVEY OF LOGISTICS SUPPORT ANALYSIS IMPLEMENTATION WITHIN AERONAUTICAL SYSTEMS DIVISION SYSTEM PROGRAM OFFICES

John A. Knox, Captain, USAF
Thomas N. Thede, Captain, USAF

LSSR 101-83

DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY (ATC)
AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

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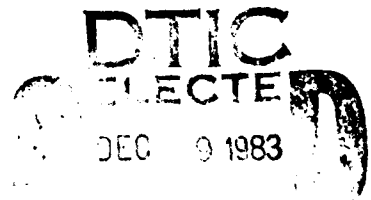

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Logistics Support Analysis (LSA) represents the selective application of scientific and systems engineering efforts undertaken during the acquisition of Air Force equipment which assist in compliance with supportability and other integrated logistics support objectives. This integration of logistics into design engineering involves the use of analytical tools and models throughout the acquisition cycle to evaluate alternative support concepts to meet system readiness objectives at minimum cost. Many logisticians in the acquisition community have demonstrated significant reluctance in accepting LSA as a viable tool, although some form of LSA has existed for over ten years. This research addressed the use of LSA within the Aeronautical Systems Division (ASD) of Air Force Systems Command at Wright-Patterson Air Force Base. A survey of fifty logisticians and engineers indicated necessary personnel in ASD program offices were fairly familiar with the LSA process, although they believed additional training was necessary. Based on their responses, program personnel were ensuring LSA was effectively applied on current acquisition programs. Additionally, the respondents believed most reviews of LSA contractor implementation were adequately performed and that LSA "lessons learned" applicable to the Army could help ASD logisticians and engineers avoid similar problems.

LSSR 101-83

A SURVEY OF LOGISTICS SUPPORT ANALYSIS IMPLEMENTATION WITHIN AERONAUTICAL SYSTEMS DIVISION SYSTEM PROGRAM OFFICES

A Thesis

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirement for the

Degree of Master of Science in Logistics Management

By

John A. Knox, BBA, MBA
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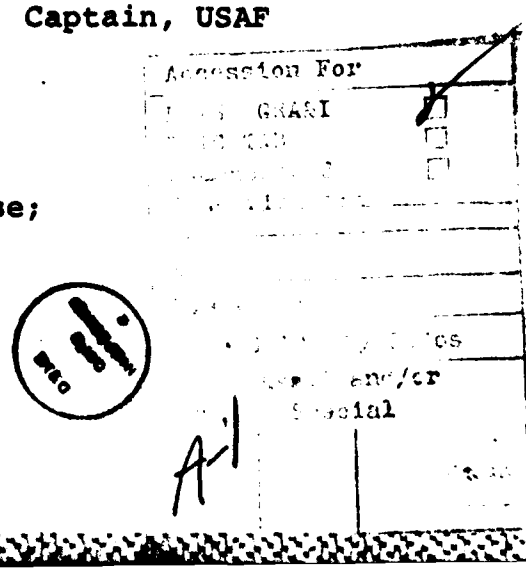

This thesis, written by

Captain John A. Knox

and

Captain Thomas N. Thede

has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirements for the degree of

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CHAPTER 1

INTRODUCTION

Background

A brief explanation describing the relationship between logistics support analysis (LSA) and integrated logistics support (ILS) is required to acquire full appreciation of the need for LSA and the LSA record (LSAR). At one time, defense managers almost totally concentrated on the acquisition of systems and equipment. They now realize inadequate support for these items can significantly reduce system reliability, maintainability, and availability, in addition to increasing life cycle costs significantly. In fact, operation and maintenance costs often exceed acquisition costs during the first five to seven years of an equipment's life and continue to mount thereafter (8:23). Older weapon systems, such as the B-52 aircraft which has been in the Air Force inventory for over 20 years, reflect this trend. As pointed out in a Spring 1981 issue of Spectrum:

> Since 1967 the operating and support costs for each hour we fly an aircraft have quadrupled . . . Over a 20 year period, it has been estimated that the Air Force spends two dollars on operating and support costs for every dollar spent to buy the weapon system; i.e., the cost of research, development, and production [2:9].

The recently revised Department of Defense (DOD) Directive 5000.1, Major Systems Acquisition, underscores the importance of this issue by specifically directing the Assistant Secretary of Defense for Manpower, Reserve Affairs, and Logistics to "ensure that logistics planning is consistent with system hardware parameters, logistic policies, and readiness objectives [19:10]." The primary vehicle used to comply with this requirement is ILS. As stated in DOD Instruction 5000.2, Major System Acquisition Procedures:

> Integrated logistics support plans and programs . . . shall be structured to meet peacetime readiness and wartime employment system readiness objectives tailored to the specific system [20:17].

Explanation of ILS

ILS represents a composite of the elements necessary to assure effective and economical support of a system or equipment item at all levels of maintenance for its programmed life cycle (9:400). Yet, this statement belies the true complexity of the ILS concept. Actually, ILS is a unified and iterative approach to the management and technical activities necessary to cause support considerations to influence system or equipment requirements and design; to specifically define support requirements that are optimally related to the design and to each other; to acquire the required support; and to provide this support during the operational phase of the system at minimum cost (15:Encl.2). In other words, ILS is a process through

which a composite of management and analysis actions are accomplished both before and after a weapon/equipment system is fielded. Logistics support resources must be developed, acquired, tested, and deployed as an integral part of the system/equipment acquisition process (13:2). According to the ILS Implementation Guide for DOD Systems and Equipments, effective application of the ILS concept requires recognition of four basic principles:

> 1. The definition, development and implementation of logistic support must include the consideration of those factors which significantly influence the effectiveness and the cost of support over the life cycle of the equipment system.
>
> 2. The elements which are required to establish the capability to support the system or equipment collectively constitute a 'support system'.
>
> 3. The elements of support must be defined, developed, and implemented as an integrated support system.
>
> 4. The support system must be responsive to requirements imposed by the equipment, its utilization, and its operational environment [17:pp.III-1 to III-2].

DOD Directive 5000.39, Acquisition and Management of Integrated Logistics Support for Systems and Equipment, outlines the policies and responsibilities necessary to implement ILS. ILS is broken down into nine distinct elements in accordance with this directive: the maintenance plan; manpower and personnel; supply support (including initial provisioning); support and test equipment; training and training devices; technical data; computer resources support; packaging, handling, storage, and transportation; and facilities. Likewise, the directive prescribes neces-

sary documentation to quantitatively link related design parameters and ILS requirements to system readiness objectives in addition to defining the detailed support element requirements (15:2). Logistics support analysis, which really represents the heart of ILS implementation, is this process of documenting the interface between engineering design and support requirements.

Explanation of LSA

The glossary of Military Standard 1388-1A, Logistics Support Analysis, provides a precise definition of LSA:

> The selective application of scientific and engineering efforts undertaken during the acquisition process, as part of the system engineering and design process, to assist in complying with supportability and other ILS objectives [18:106].

One must look at the systems engineering process in more detail in order to understand this integration of logistics into systems engineering. Systems engineering is that engineering process which transforms a military requirement (operational need) into a description of the system performance parameters, a preferred system configuration, and a plan for subsequent development. In other words, the systems engineering process involves looking at a project from the overall systems aspect rather than the individual engineering disciplines. Systems engineering encompasses design engineering, specialty engineering, test

engineering, and production engineering. The specialty engineering disciplines include logistics engineering. The analyses and trade-offs conducted through the LSA are an integral part of the logistics engineering function (1:1).

LSA includes the use of analytical tools and models throughout the acquisition cycle to evaluate alternative support concepts, perform trade-offs between system design and the ILS elements listed above, and perform trade-offs among ILS elements themselves to meet system readiness objectives at minimum cost. LSA actually starts in the conceptual phase of the acquisition process and increases in complexity as the system evolves through the remainder of the acquisition phases (21:21). DOD Directive 5000.1, Acquisition of Major Defense Systems, states "logistics support shall also be considered as a principle design parameter with the magnitude, scope, and level of this effort in keeping with the program phase [14:2]." The LSA levels of effort required within respective acquisition phases are listed in Figure 1; however, LSA may be accomplished on any system or equipment and in any program phase to varying degrees of depth depending on the need and extent of system/equipment definition. That is, LSA may assume different proportions. Allocations and gross-level predictions are necessary to accomplish the required analysis since data in the early phases of the system/equipment definition is limited and sketchy. As the program pro-

Designation	Application Period	Depth of Analysis/Application of Output Data
Level 1	Prior to full scale	To a level sufficient to provide cost relatable inputs to logistic simulations, cost effectiveness models and trade-off studies, and life cycle cost analysis.
Level 2	Full scale development (system design)	To a depth sufficient to provide inputs to equipment design which optimize support characteristics; input to economic repair/discard analyses, establish baseline maintenance concept for preliminary ILS planning.
Level 3	Full scale development (detail design)	To a depth sufficient to identify logistic requirements, establish detailed maintenance plan, inputs to ILS plan, verify support parameters, and provide logistic support documentation.
Level 4	Production/Deployment	Same depth of analysis in Level 3 applicable to engineering changes, logistics studies, and major modifications.

Source: Integrated Logistics Support Implementation Guide for DOD Systems and Equipments

Figure 1. Progressive Levels of the Logistic Support Analysis Process

gresses, additional data (analytical data replaces prediction data, field data replaces designed analytical data, etc.) becomes available and results are more meaningful (17:pp.III-11 to III-12).

The ultimate goal of LSA is to obtain reliable, maintainable, transportable, and supportable systems and equipment at the least cost of ownership. Specific examples of LSA applications used to accomplish this objective include manpower and logistics analysis, parametric estimates, requirements and trade-off analysis, establishment of logistic goals and effectiveness measures, mathematical techniques for projecting life cycle operating and support costs, making repair versus throwaway decisions, and optimizing repair levels (13:5). Logisticians and systems engineers can identify potential deficiencies which may be corrected by design or program management action by examining the outputs of these LSA applications.

Explanation of LSAR

Just as LSA was described above as the heart of ILS, the heart of LSA is the Logistics Support Analysis Record. The LSAR (referred to as supportability analysis record (SAR)) section of the Guide for Supportability Analysis and Supportability Analysis Record provides a succinct explanation of the relationship between LSA (referred to as supportability analysis (SA)) and LSAR.

> The SA integrates analyses and data from many disciplines (design, reliability, maintainability, safety, etc.) and represents the interface between equipment design and support planning. As the SA process evolves, it is essential that records are maintained to document task results to provide an auditable support data base, and identify the essential support resources. The SAR is the medium through which task results and support resource data are recorded. (It) is established to provide systematic, controlled and cost effective means for input, storage, analysis, and retrieval of data generated through the SA process or pertinent to SA accomplishment [1:95].

The LSAR provides a single source of logistics data for documenting reliability and maintainability analyses; maintenance planning; support and test equipment; supply support; manpower requirements and personnel; training and training support; technical orders; facilities; and packaging, handling, storage, and transportation. The strong relationship between this list and the ILS program elements is not coincidental. LSAR can be used by engineers, designers, logisticians, etc., within both the contractor's organization and the Air Force to develop and validate support capabilities and requirements (1:95-96).

Although LSA is a DOD program, defense contractors actually prepare and maintain the LSAR in accordance with Military Standard 1388-1A. This document prescribes the specific tasks and subtasks that comprise the LSA process. Major tasks include program planning and control; mission and support systems definition; preparation and evaluation of alternatives; determination of logistic support resource requirements; and supportability assessment. The military

standard outlines a total of 15 subtasks; however, LSA users are encouraged to "tailor" their documentation needs according to the peculiarities of their respective acquisition, i.e., the technological complexities of the system/equipment involved and the particular point in the life cycle that the LSA process is initiated (7:18).

Although LSA implementation procedures may vary due to the type of system and associated support requirements to be acquired, the preparation of LSAR data records, either manually or using data processing techniques, represents a common denominator among all contractors. One or more of the following LSAR data records may be required, depending on ultimate customer needs:

Data Record A	Operations and Maintenance Requirements
Data Record B	Item Reliability and Maintainability Characteristics
Data Record B1	Failure Mode and Effects Analysis
Data Record B2	Criticality and Maintainability Analysis
Data Record C	Operation and Maintenance Task Summary
Data Record D	Operation and Maintenance Task Analysis
Data Record D1	Personnel and Support Requirements
Data Record E	Support Equipment and Training Material Description and Justification

Data Record E1	Unit Under Test and Automatic Test Program and Training Material Description
Data Record F	Facility Description and Justification
Data Record G	Skill Evaluation and Justification
Data Record H	Support Items Identification
Data Record H1	Support Items Identification (Application Related)
Data Record J	Transportability Engineering Characteristics [16:515-516]

These data are collected and recorded on the basis of the order in which maintenance personnel would disassemble the system/equipment at the location where the maintenance task is to be performed. At this point, a maintenance task analysis is conducted for each repairable maintenance candidate and is categorized as operational, preventive maintenance, checkout, replacement, test, or repair. As the list of records above suggests, the task analysis defines not only specific maintenance actions, but also required support equipment, tools, personnel and training requirements, etc. The contractor then develops a time line of subactivities to determine the elapsed maintenance time and man-hours for each task (8:25).

Air Force LSA Guidance

The Guide for Supportability Analysis and Supportability Analysis Record, prepared by Air Force Acquisition

Logistics Division (AFALD), is the most comprehensive Air Force guidance to date addressing LSA applications and implementation. This Guide is based on the requirements of the U. S. Army Materiel Development and Readiness Command (DARCOM) Pamphlet 750-16, DARCOM Guide to Logistic Support Analysis, the proposed Military Standard 1388A, Weapon System and Equipment Support Analysis, and Military Standard XXX, Weapon System and Equipment Support Analysis Documentation (1:ii). Since publication of the AFALD Guide in July 1982, the proposed Military Standard 1388A has been published as MIL-STD-1388-1A, Logistics Support Analysis; and MIL-STD-XXX is now referred to as the proposed MIL-STD-1388-2A, DOD Requirements for a Logistics Support Analysis Record. Regardless of these changes, the AFALD Guide is still current and provides extremely detailed steps explaining the functions and utility of supportability analyses.

The recently released Military Standard 1388-1A is the basic document which actually establishes guidelines and requirements for LSA in the acquisition process. These criteria are applicable to major and less-than-major system/equipment acquisition programs, major modification programs, and applicable research and development projects. The primary objective of the standard is:

> A single, uniform approach by the Military Services for conducting those activities necessary to (a) cause supportability requirements to be an integral part of system requirements and design, (b) define support requirements that are optimally related to the design

and to each other, (c) define the required support during the qperational phase, and (d) prepare attendant data products [18:iii].

Brief History of LSA

In the middle 1960's, the DOD first emphasized the integration of logistics support considerations in the acquisition of weapon/equipment systems. This integration was referred to as ILS and included the use of Maintenance Engineering Analysis (MEA). MEA provided a means to identify logistics resource requirements as part of the design process. However, a data system was required to document these efforts. The Army and the Navy independently developed similar systems in the late 1960's known as MEA Data System and MEA Record System, respectively. In addition, the Joint Logistics Commanders sponsored the development of the Standard Integrated Support Management System (SISMS) which also had another data system format. SISMS was developed to standardize procedures for the multi-service acquisition of aircraft and provide a single source of information to manage ILS programs. Yet, SISMS gave the impression that logistics data costs would be unnecessarily high and therefore was not universally accepted (5:11).

None of these data systems was entirely satisfactory, so in the early 1970's, a tri-service working group was formed. This working group changed MEA to LSA and referred to the documentation as LSAR data. The working

group's primary purpose was to draft LSA procedures and develop a data system which was compatible among all three services. In 1973, Military Standard 1388-1/2 was published. The military standard illustrated sample input formats and a standard data element dictionary, but stopped short of providing a complete, usable data system. The services were left to develop the LSA concepts into a usable system by formulating computer programs and associated operating instructions. Both the Army and the Navy had independently developed similar data systems in the middle 1960's, so they had few problems complying with the standardized format known as LSAR data (10:28). There is no indication that the Air Force became actively involved in LSA applications until a few years later.

In 1978, the Office of the Secretary of the Defense (OSD) directed AFALD to resolve the discrepancies that were preventing the complete application of LSA concepts on Air Force programs. AFALD responded by developing briefings to familiarize Air Force program managers and logisticians with LSA and helping these individuals to get LSA included in system/equipment acquisition contracts. A DARCOM data system was used in a tailored form to document the LSA efforts in Air Force acquisitions. As stated earlier, AFALD developed a user's guide to assist logisticians in this effort (1:22). Nevertheless, many Air Force logistics managers continue to resist LSA applications (6).

Statement of the Problem

Many Air Force logisticians have demonstrated significant reluctance in accepting LSA and LSAR in spite of the fact that LSAR is the primary logistics requirements data base currently authorized for DOD systems acquisitions. In addition to the usual uncertainties generated by any type of change in acquisition procedures, many Air Force acquisition managers have resisted LSA implementation because of the accompanying high contractual costs. Such costs can be especially high if LSA tasks are not properly tailored (6).

LSA-related problems experienced by the Army indicate the reservations expressed by Air Force logisticians are not totally unwarranted. The semiannual Integrated Logistic Support Lessons Learned Reports compiled by the DARCOM Materiel Readiness Support Activity denote numerous examples of LSA implementation difficulties. In fact, it is surprising that Air Force acquisition logisticians do not take advantage of this source of information. Information gained from unfortunate experiences of others can sometimes be an extremely valuable management tool. Our initial research indicated that some individuals in the Air Force acquisition logistics community believed one of the major problems with LSA is that it is primarily an Army program which should be "revamped" to better fit Air Force acquisitions. Nevertheless, LSAR serves the same purpose

for all major armed services components: documenting logistics support requirements. Since this purpose represents a common goal that is not peculiar to any one DOD faction, the utility of the ILS lessons learned reports may be very beneficial.

Objectives of Research

1. Define the LSA process, how the process is supposed to operate, and benefits which can be accrued by applying the process.

2. Analyze the use of LSA in current system program offices within Aeronautical Systems Division (ASD).

3. Analyze the extent to which LSA data is being utilized by system program offices within ASD.

4. Identify any problems with LSA implementation in ASD acquisitions and propose possible recommendations.

5. Determine if lessons learned by the Army can help ASD program personnel avoid similar problems.

Research Questions

1. Are the necessary personnel in ASD program offices familiar with the LSA process to ensure this process is being utilized?

2. Is the LSA process applied effectively on current Air Force acquisition programs within ASD?

3. How effective is the LSA review process within ASD?

4. Will the availability of lessons learned packages from the Army help ASD program office personnel avoid similar LSA/LSAR problems?

CHAPTER 2

LITERATURE REVIEW

Literature addressing either LSA or LSAR is lacking even though the first military standard requiring LSA in the DOD system/equipment acquisition process was published in 1973. The overwhelming majority of articles that do approach this subject are simply topical in nature; they generally describe what LSA is, how it is used, and benefits derived from LSA/LSAR applications. Despite the controversial nature of LSA in many acquisition logistics circles, only one article reviewed actually denoted research of LSA utilization (3). This article focused on ILS as a whole with only a small segment dedicated to researching the usefulness of LSA as a logistics tool as perceived by ASD and AFALD management personnel. Nevertheless, the few writings that have been published provide some degree of insight into the evolution of LSA as it now exists. Since the people who actually develop and build weapon/equipment systems are the primary users of LSA, it is not surprising that almost all articles published to date are authored by engineers, logisticians, or a combination of the two occupations, within the defense industry.

In a brief reference to the military's recognition of the interrelationship of logistics analysis and the (system/equipment) design process, Lee C. Zastovnick, logistics program manager of a Rockwell International corporate division, pointed out many of the benefits derived using logistics analysis techniques. Whether minimum life cycle costs, maximum availability, minimum weight, or any other selected feature is the primary objective, logistics analysis techniques will provide a designed support system that complements a designed product. Additionally, the product can undergo several redesigns until the desired candidate is selected, as long as logistics analysis is performed on each alternative design. Yet, Zastovnick points out that "LSA is usually applied discretely, instead of being an inherent part of the design, which limits its benefit [24:11]." Another inherent problem is that LSA uses specific factors which are based on a "standard" product utilization scenario. Therefore, different scenarios warrant logistics analysis under each possibility, which can be a complicated process (24:11). For these and other reasons, both engineers and logisticians have not overwhelmingly accepted LSA as a viable tool to integrate engineering design and logistics support.

Hughes Aircraft Company introduced LSA and LSAR when the firm realized that the preparation of Preliminary Maintenance Allocation Charts for the Army and Maintenance

Engineering Analyses for the Navy and Air Force was unproductive. Since the analysis of maintainability, provisioning, technical manual, and training requirements were all performed independently, these analyses resulted in duplication, uncoordinated activities, and diverse support concepts. Clearly, "it was apparent that LSA, specifically the LSAR, was a method of data maintenance that could no longer be suppressed [12:35]." The Army Ground Located Laser Designation program represented one of the first applications of LSA at Hughes. Naturally, the transition was not problem-free; accurate cost estimating and acceptance by design engineers were the two most difficult barriers to overcome. Some engineers/analysts actually left the company after individual training on data sheet preparation, data processing procedures, and the computer interface; and potential employees refused employment when they realized the extent of the documentation required (12:36).

Now LSA/LSAR is "firmly entrenched" as the data base for logistic planning at Hughes. Output summaries readily identify support requirements at each level of maintenance and identify high resource utilizers, i.e., cost drivers. A Winter 1978 article in Spectrum magazine depicting the introduction of LSA/LSAR within the company lists several benefits derived from LSA: increased sales due to increased productivity; a viable integration of support which forces people to work together; a much

improved provisioning process; a smooth transfer of information; and immediate information for logistics decision makers (12:36-38). Hughes is now a strong advocate for logistics support analysis and encourages universal acceptance:

> Having experienced the pains of LSA/LSAR birth and trauma of its adolescence, like any parent one wonders why the rest of the world cannot recognize the obvious virtues. Hughes suggests that it is a simple matter of exposure. LSA/LSAR is now--and will be--the integrated data base of the future. There is little other alternative [12:39].

Westinghouse Electric Corporation is another defense firm which quickly recognized the favorable aspects of LSA, especially in relationship to life cycle cost computations. In fact, the company coordinated on the original Military Standard 1388 prior to its release. Within the Integrated Logistics Support Division, W. R. Wakefield, a logistics engineer, and E. L. Wienecke, a maintenance systems engineer, authored a September 1977 article explaining that, prior to LSA, there were few or no sources of good historical data to facilitate life cycle cost decisions and prevent reoccurrence of past system design mistakes. Current data systems were "outmoded, unresponsive, inadequate, difficult to use, voluminous, and costly [22:7]." A mechanized logistics data bank with LSAR as the foundation represented the initial effort to overcome these obstacles. In addition to diminishing life cycle cost estimating difficulties, the data bank was designed to

provide basic LSAR data reports, integrate numerous logistics engineering analytical models from both the DOD services and Westinghouse sources, and provide data management to all integrated logistics support agencies. Wakefield and Wienecke predicted that the data bank would become an "invaluable asset" to Westinghouse for designers of both system and support (22:8-12). Subsequent articles by Westinghouse engineers indicate this prediction was well-founded.

In January 1979, M. Silver and N. L. Orndorff, a maintenance engineer and logistics engineer, respectively, within the Westinghouse Integrated Logistics Support Division, described LSA and the LSAR as "the prime tools of the maintenance engineer during the design phase of a program [11:11]." The initial output identifies the quantitative and qualitative logistics requirements which are refined into design parameters as the program progresses. Analysis results, i.e., outputs, are then used in trade studies, risk analysis evaluations, and the development of support products and personnel requirements. Through examination of these outputs, potential maintenance deficiencies can be identified and corrected by design or program management action (11:11). The design phase of a major modification to a Westinghouse surveillance radar system represents an example of effective LSA application in maintenance engineering where:

> The LSA process . . . determined the optimal packaging for the digital receiver and digital blanker assemblies. Documented evidence was obtained that a change in the proposed packaging could save time and money in fault isolation, spare parts, tools, and test equipment. The changes were implemented at a minimum impact in cost and schedule because it was done early enough to affect only a small amount of paper [11:11].

Electronic Support Centers developed for a multinational market represents another example of LSA application at Westinghouse. After an initial integrated logistics support plan was developed, additional capabilities required by user nations to achieve their desired goals were defined using both computer-based and manual LSA. The analysis defined maintenance requirements, optimum repair levels, and all capabilities needed to make the centers operational: facilities, material handling, training, technical data, spares, and transportation. These requirements were then successfully translated into the resources required to complete each center (7:21).

The most recent LSA article reviewed was also written by two Westinghouse logistics engineers who describe the most recent LSA refinements at the company. In the September 1982 issues of Logistics Direction, I. Weinstein and E. Plata indicate the corporation "is one of the few companies which has a single group devoted to production of LSAR for all programs [23:5]." The authors primarily reiterate the corporate evolution of LSA and point out that this effort has received the commitment of the highest

levels of Westinghouse management who approved and funded an LSA/LSAR Implementation Strategic Project Plan. This project is designed to provide major modifications, updates, and improvements to the LSA process. Weinstein and Plata related that:

> The complexity of modern equipment dictates that LSA continue to grow in capability and efficiency, and be recognized as a major tool for achieving totally coordinated and integrated supportability in system design [23:6].

In sharp contrast to the praises bestowed on the LSA/LSAR process in past publications, the only study which has addressed the acceptance of LSA in the DOD community indicates this tool is generally not understood. In September 1982, Major John R. Hull and Captain Gregory L. Lockhart of the United States Air Force authored a thesis which examined the barriers to fully implementing ILS in system acquisition as perceived by ILS managers and program managers. Their research included a summary of an unpublished special study addressing ILS planning and support for engines which indicated that LSA may be a difficult process for program managers, deputy program managers for logistics, and contractors to understand. Their research indicated:

> (LSA) is often alleged to be redundant, unreliable, and very costly, particularly if the data requirements are extensive. For these reasons, many principals in acquisition perceive LSA as being an ineffective and inappropriate tool for some applications [3:24].

Therefore, LSA was listed as one of several "proposed barriers" to ILS implementation in a questionnaire applied to 40 ASD program/project managers and 37 AFALD logistics managers.

One of the most interesting results of this portion of their research was the small number of managers who chose to comment on LSA--only one individual from ASD and 11 from AFALD. According to Hull and Lockhart, the one response from ASD "may show the amount of attention paid this most highly touted tool [3:58]." Hull and Lockhart also indicated that this lack of comments could reflect either ambivalence about the usefulness of LSA or ignorance of LSA in general. Nevertheless, the overall results of this research effort did not indicate that LSA, as a logistics management tool, was a perceived barrier of ILS implementation (3:70).

In summary, the conflicting views of LSA/LSAR described above, along with the limited number of articles approaching this subject, are really not surprising. LSA in its current form is still regarded as a relatively new process. If individuals currently in the throes of applying LSA procedures will document their efforts and subsequent results, others may benefit. There are no indications that LSA is perfect in its current form, but there is also no indication that a suitable alternative linking system/ equipment design features to logistics support requirements

has surfaced. As H. L Starr and Oscar D. Teel stated in their 1978 Spectrum article:

> The universal acceptance of logistics support analysis and the LSAR has been slow. This is understandable, but not acceptable in a world of dwindling resources and increasing logistics complexity [12:3].

CHAPTER 3

METHODOLOGY

Population

The population of interest for this research effort was limited to those personnel involved directly in the implementation of LSA in system program offices (SPO) within ASD at Wright-Patterson Air Force Base, Ohio. This research was directed to those programs that had LSA on contract. Major programs, less-than-major programs, and modification programs were included. The Deputy Program Manager for Logistics (DPML) or the Integrated Logistics Support Manager (ILSM), as applicable, were the first point of contact for each program. Afterwards, the researchers contacted the LSA focal point and any engineering personnel involved in the LSA effort. (This was not always the case though, because sometimes LSA was only an additional duty for the DPML or ILSM.)

Data Collection

The data collection instrument was a structured personal interview with ASD SPO personnel. The researchers created an LSA survey with a number of survey questions directed toward answering each of the four research ques-

tions. These survey questions were general in scope and allowed the respondent to expand into a wide variety of relevant topics that the researchers may have overlooked. In addition, the interview methodology allowed the researchers to provide on-the-spot explanations of the survey questions, if needed. The survey instrument used is included as an Appendix. These steps were used to produce better responses than a questionnaire.

The questions on the survey were developed by referring to the Guide for Supportability Analysis and Supportability Analysis Record published by the Air Force Acquisition Logistics Division Directorate of LSA (AFALD/PTA). The Guide provides those steps necessary to ensure LSA is being applied effectively on an Air Force acquisition contract. In addition, the fourth research question involved the use of ILS lessons learned from DARCOM Materiel Readiness Support Activity in Lexington, Kentucky.

Several personnel from AFALD/PTA critiqued the instrument for validity and comprehensiveness. Their inputs were incorporated because they authored the previously mentioned Guide and assist in the determination of LSA policy guidelines for the Air Force.

Method of Analysis

A series of 19 survey questions were developed to answer research question 1, which is designed to determine

whether necessary personnel in a program office are familiar with the LSA process. The first seven survey questions covered general background information on the respondent and provided general data on the demographics of the population. Survey questions 8, 9, 17, 18, and 19 addressed the respondents' familiarity with LSA documents in either content or distribution. Survey question 10 asked the respondents to evaluate their knowledge of LSA policies and procedures; survey question 11 asked the respondents their opinion pertaining to the effectiveness of the current LSA process; and survey question 12 checked to see if the respondents used any LSA outputs. Survey questions 13 through 16 responses provided an analysis of any training the respondents may have received. In effect, these survey questions tried to find out the general background and attitude of personnel involved in the implementation of LSA.

Nine survey questions were developed to answer research question 2 regarding whether the LSA process was being effectively applied on current acquisitions. These survey questions were designed to determine whether steps were taken to ensure LSA was included on acquisition contracts in a tailored form. This is an important topic because unnecessary outputs and analyses can be both repetitive and costly. These questions all had "yes" or "no" answers, and did not lend themselves to statistical analysis.

Research question 3 addressed another important topic by providing an evaluation of the effectiveness of the ASD LSA review process. The two main objectives of the review team process are to ensure that hardware design is influenced from a logistic (supportability) standpoint and to ensure all elements of logistic support are analyzed, defined, and documented. This review process is very critical because most of LSA is accomplished by the contractor, so the review is the only way to ensure the contractor is fulfilling the terms of the contract. Seven survey questions were developed to answer this research question. The survey questions checked for performance, documentation, and appropriate follow-up actions. Statistical analysis was not performed.

The last research question was designed to determine whether the availability of LSA-related lessons learned from the Army would help Air Force managers avoid similar problems. This research question used a total of 11 ILS lessons learned documented by the Army. These lessons learned were discovered when the researchers were reviewing the literature on LSA and were included because Air Force personnel were not utilizing the experience of the Army (which has used LSA concepts since the late 1960's). Two survey questions were used for each lesson learned: one addressing applicability to the respondent's current program, and one on the general helpfulness of the lesson

learned. The survey questions were written in a multiple choice form and analyzed by individual lesson learned, by personnel category, and in aggregate. Histograms and tables were used to illustrate results.

Limitations

This research effort did not attempt to rigorously analyze the application of LSA within ASD. Instead, it attempted to find general attitudes and problems that would assist Air Force planners in ensuring LSA was effectively applied. This effort tried to lay the basis for future analyses which should look at specific parts of the LSA, especially the LSAR, in more detail. The last research question only attempted to supplement the LSA knowledge base in the Air Force by using knowledge gained by the experience of the Army.

CHAPTER 4

FINDINGS

Introduction

The findings are addressed in the same order that the research questions were presented in the interview survey. A total of 50 individuals from ASD involved in 28 acquisition programs provided responses to the survey. Because some of these individuals were simultaneously involved in as many as 30 different system/equipment programs, the researchers requested that each of these individuals provide responses applicable to the system/equipment which they were primarily associated with (i.e., the LSA-related acquisition project which required the majority of their working time). Additionally, there was no attempt to verify the accuracy of responses received; instead, information received was taken at face value. Responses were accumulated during an eight-week period beginning 13 June 1983. (The researchers established a cutoff date for responses to provide themselves sufficient time to complete the study within thesis time constraints.)

Research Question 1

Survey results for research question 1 are arranged in the same manner indicated under methodology. The find-

ings are organized to provide respondent demographic information; to determine their familiarity with logistics support analysis (LSA) documents, including recommended improvements to these documents; to evaluate the respondents' opinions regarding their knowledge of LSA policies and procedures; to obtain the respondents' views regarding the effectiveness of the LSA process; to determine whether these individuals used any LSA outputs in accomplishing current duties; and to examine the extent and quality of LSA training the respondents had received. Since it was unreasonable to expect all individuals in a program office to have the same degree of familiarity with LSA, regardless of their position, results are broken out into three categories.

The "logistics managers" category includes deputy program managers for logistics, division chiefs, and other individuals who performed supervisory duties in the ILS sections of program offices. Survey results for respondents who were primarily responsible for monitoring the adequacy of contractor LSA implementation from a logistics standpoint are presented in the category entitled "logistics monitors". These individuals performed functions to ensure logistics support requirements were adequately integrated into the design of weapon systems or associated equipment and to verify such requirements were subsequently documented in the LSA/LSAR effort. The last category, "engineering monitors", includes those respondents who provided

design engineering support to the logistics monitors. During the time survey responses were acquired, only six engineering monitors could be located who had general knowledge of LSA policies and procedures. Regardless of this small number, the researchers believed the inclusion of results denoting the adequacy of LSA from an engineering viewpoint would help provide a more complete picture of the general acceptance of this logistics tool.

The findings in this section are formatted in a sequence of questions attributive to the general areas described above (demographic information, familiarity with LSA documents, etc.), followed by tables providing survey responses broken down into the three organizational categories: logistics managers, logistics monitors, and engineering monitors. Observations pertaining to the responses are inserted at the end of the tables when appropriate. These observations sometimes include general comments and additional information provided by the respondents which the researchers believed were relevant for determining the overall familiarity with and acceptance of LSA in ASD program offices.

Demographic Information

What is your present grade?

a. O-1 to O-3
b. O-4 to O-5
c. O-6 or higher
d. GS-9 to GS-12
e. GS-13 to GS-14
f. GS-15 or higher
g. Other

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.		4	3	7
b.		4	1	5
c.	4			4
d.	2	21	1	24
e.	4	4	1	9
f.		1		1

How long have you worked in your current position?

a. Less than six months
b. Six months to one year
c. One year to two years
d. More than two years

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.	2	3		5
b.	2	9	1	12
c.	2	9	1	12
d.	4	13	4	21

How long have you worked in systems acquisition?

a. Less than six months
b. Six months to one year
c. One year to two years
d. More than two years

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.	1	1		2
b.		6		6
c.	1	3	1	5
d.	8	24	5	37

Into which of the following general areas would you classify your overall experience in systems acquisition?

a. Logistics Management
b. Program Management
c. Systems Engineering
d. All of the above
e. Both "a" and "b"
f. Both "b" and "c"
g. Both "a" and "c"
h. Other(s)_____

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.	6	22		28
b.				
c.			1	1
d.		3	3	6
e.	4	8		12
f.			1	1
g.		1	1	2

Observations: The questions above provide general background information regarding the respondents. Thirty-three of the 50 individuals who completed surveys were civilians and 17 were military (16 officers and one enlisted). The typical respondent was a "logistics monitor" in a grade position of GS-9 to GS-12. Two thirds of the respondents had been in their current positions for over one year, and a similar number had more than two years of experience in systems acquisition. The majority of individuals (28) classified their overall experience as being exclusively in logistics management, while 12 indicated they had both logistics management and program management experience.

Approximately how many man-hours per month do you spend performing duties associated with Logistics Support Analysis (LSA)?

a. Less than 10
b. 10 to 20
c. 20 to 30
d. 30 or more

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.	4	16	2	22
b.	5	9	2	16
c.		1		1
d.	1	8	2	11

Would you consider your position as the "focal point" for LSA for the system you are primarily associated with?

a. Yes, my position is the focal point.
b. The focal point is at a higher level in this office (i.e., first three letters of office symbol are the same).
c. The focal point is at a lower level in this office (i.e., first four letters of office symbol are the same).
d. The focal point is in a different office. Please specify the office symbol for that office.

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.	2	25		27
b.		2	1	3
c.	7	3		10
d.	1	4	5	10

Observations: Interestingly, almost half (22) of the respondents indicated they spent less than 10 hours per month performing duties associated with LSA, although 27 considered their position to be the LSA focal point for the system they are primarily associated with. Twenty-five of the 27 "focal point" personnel were logistics monitors, but only 18 spent 10 hours or more performing LSA-related duties. Conversely, six of the ten logistics managers spent 10 hours or more performing such duties, whereas only two

believed their position was the focal point. A total of 10 individuals indicated the LSA focal point was in a different office within their organization. Five of these individuals were engineering monitors. The other five individuals who said they were not the focal point were primarily from program offices associated with one weapon system. These offices usually had more than one user of LSA output.

Familiarity with LSA Documents

Are you familiar with MIL-STD-1388A, Weapon System and Equipment Support Analysis?

a. Yes
b. No

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.	9	29	3	41
b.	1	5	3	9

Are you familiar with the "Guide for Supportability Analysis and Supportability Analysis Record" prepared by AFALD/PTA?

a. Yes
b. No

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.	9	21	2	32
b.	1	13	4	18

Observations: Overall, the great majority of respondents (82%) were familiar with Military Standard

(MIL-STD)-1388A, with slightly fewer familiar with the Guide. Of the nine persons who were not familiar with MIL-STD-1388A, five were logistics monitors; and surprisingly, four of these logistics monitors considered their positions as the LSA focal point for the system they were primarily associated with. Only one of these three individuals had less than six months experience in their current position. None of the nine individuals who were not familiar with MIL-STD-1388A were familiar with the Guide.

What would you like to see additionally in the previously mentioned "Guide for Supportability Analysis and Supportability Analysis Record"?

Observations: Fourteen individuals responded to this question. Although no common theme was apparent in the responses, the majority of the requests addressed either less-than-major programs, the use of LSA input/output, cross-referencing, or lessons learned:

Less-Than-Major Programs

"Procedures for less-than-major programs."

"More specific instructions on how to tailor LSA for less-than-major programs."

Input/Output

"Actual samples of input data for a simple system, a complex system, and a piece of support equipment. This information should

be related (i.e., an aircraft system, a subsystem on the aircraft, and a piece of support equipment for the subsystem)."

"More emphasis on possible uses for contractor generated LSA information."

"LSA program time-line flowcharts such as the ones in the unapproved Westinghouse management and application handbook not currently available for distribution."

"Sample statement of work for a contractor to provide a computer terminal, line printer, associated services (e.g., installation, test, maintenance), and periodic computer tape submittals of the LSAR data base."

Cross-Referencing

"A cross-reference to MIL-STD-1388-1A and MIL-STD-1388-2A (i.e., applicable paragraphs and/or charts)."

"Tasks relating to data items listed or cross-referenced."

Lessons Learned

"Should be periodically updated to include results of 'lessons learned'."

"Needs to be updated more and provide lessons learned from other ASD programs."

Other

"The dollars are tied to support equipment, technical orders, and spares. Concentrate on three LSARs for these items and eliminate the rest of the data."

"More help/suggestions that apply LSA to the 'real world' acquisition process."

"Need more detail."

"Increased emphasis in conducting LSAR audits: what should be reviewed and the procedures."

Do you receive the AFALD/PTA newsletters?

a. Yes
b. No

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.	4	13	1	18
b.	6	21	5	32

How useful is the information provided in the AFALD/PTA newsletters?

a. Very useful
b. Somewhat useful
c. Not useful
d. I don't receive the newsletters

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.		3	1	4
b.	4	8		12
c.		2		2
d.	6	21	5	32

Observations: Apparently, the AFALD/PTA newsletters are not widely disseminated, even though over 90% of the individuals who receive the newsletters believe the information is at least somewhat useful.

Knowledge of LSA Policies and Procedures

How would you rate your knowledge of LSA policies and procedures?

a. I am not knowledgeable of them
b. I am fairly knowledgeable of them
c. I am very knowledgeable of them

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.	1	6	1	8
b.	7	23	4	34
c.	2	5	1	8

Observations: Over 80% of the respondents indicated they were at least fairly knowledgeable of LSA policies and procedures. Half of the people who indicated they were not familiar with LSA policies and procedures also indicated they were not familiar with MIL-STD-1388A. This result indicates that the other four were familiar with MIL-STD-1388A, but still do not feel knowledgeable about policies and procedures prescribed in the standard.

Perceived Effectiveness of the Current LSA Process

Do you think the current LSA process is effective?

a. Yes
b. No. Please make recommended improvements:_____

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.	5	15	3	23
b.	5	16	3	24
Not sure:		3		3

Observations: Less than half of the respondents thought the current LSA process was effective. Twenty-seven individuals provided recommended improvements, five thought the current process is effective, and 22 thought otherwise. The majority of respondents were concerned with the "usability" of LSA input or output (10 responses).

Eight individuals believed more LSA training or education is necessary to make the process more effective, and the remaining eight persons either thought LSA should be integrated with other logistics tools more effectively (five responses), or the current LSA process was not acceptable for less-than-major programs (four responses). Their responses, roughly categorized in the four areas addressed above (usability, training/education, less-than-major programs, and integration), are presented below:

Usability

"Unable to extract information in appropriate format."

"From certain aspects it is very effective (data integration, contractor internal interface, etc.). Other aspects such as output summaries are less effective."

"Too much paperwork. Let's go back to maintenance level analysis/reviews (on-site) with hardware to identify support equipment/ technical order needs."

"Need more Air Force definition as to LSA requirements."

"I question if the process can be converted to action that brings changes."

"The timing of the LSA makes it ineffective. Use on R&D (research and development) projects."

"The LSA is too large and complex to be of value."

"It needs to be in a more readable and usable format. I think most people just file LSA information."

"LSA is effective in a normal program. In a highly concurrent program like I manage, the effectiveness is very marginal."

"SERD-LSA (support equipment recommendations data) made one. Increased automation."

Training

"Training deficiency, staffing problem."

"Individuals applying LSA to statements of work are not trained. Evaluators during source selection are not trained. Therefore very few understand results. All trained personnel are in the headquarters and are no help."

"It is my perception that most people don't understand LSA nor make extensive use of output products."

"Need more training on application of LSA. Especially need instruction on tailoring for small programs."

"More education is required for both Air Force and contractor personnel."

"AFALD/PTA should show how LSA tasks relate to specific contract deliverable data items. Need a good class."

"Education is required to enable managers to understand and use LSA effectively."

"Improved by ASD/AL (Acquisition Logistics) to monitor with cadre of experts."

Integration

"Needs to be more integrated with the other ILS functions (e.g., provisioning)."

"Integrate with R&M (reliability and maintainability) heavily. Base B-sheets on R&M allocations to requirements."

"Improve ILS correlation, improve interactive summaries, improve tailorability, improve AFLC (Air Force Logistics Command) interface."

"Contractors must receive more specific guidance. LSA must be integrated within contractor's systems engineering process."

"1. Fully automate LSA input sheets on a current-generation computer base. 2. Require LSAR be programmed totally compatible with that current generation computer base, standard ADP (automated data processing)."

Less-Than-Major Programs

"Should not apply to less-than-major programs." (Two responses)

"Directed towards major weapon systems - requires extensive tailoring for less-than-major programs."

"Current LSA process not suited for basket SPOs. LSA is very expensive."

Use of LSA Outputs

In your current position, do you use any LSA output documentation or information provided by the contractor?

a. Yes. Please specify:_____
b. No, I don't need any LSA output documentation or information to perform my current duties.
c. No, but I think LSA output documentation/information would be helpful in performing my current duties.

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.	8	24	5	37
b.	1	6	1	8
c.	1	4		5

Observations: Over two thirds of the respondents used some type of LSA output documentation or information

in their current duties. Interestingly, eight of the ten logistics managers fit in this category. Overall, only eight individuals indicated they did not require any LSA output documentation or information to perform their current duties. Contrary to what might be expected, only one of the respondents who said they did not need any LSA output also indicated they were not familiar with LSA policies and procedures. Nine respondents provided the types of documentation and information used to perform their current duties. Eight individuals listed the types of analyses the LSA information was used for, and the other 11 respondents provided a wide range of uses with no central theme.

Input/Output

"LSA-03, LSA-20, LSA-01."

NOTE: This refers to LSAR output summaries for reliability and maintenance; tool and test equipment requirements; and direct annual maintenance man-hours by skill specialty code and level of maintenance, respectively.

"All input and summary sheets. Forms nucleus for ILS management."

"A BMAC (Boeing Military Airplane Company) formatted LSA-53 report (not a standard 1388 report, maintainability analysis - level of repair)."

"I use the data generated by the B (item reliability and maintainability requirements) and H (supply support requirements) records. Other divisions use C (task analysis summary), E (support equipment), and G (skill evaluation and justification) records."

"C and D (maintenance and operator task analysis) sheets."

"Output summaries."

"LSA output summaries and the LSA plan."

"Review A-H sheets and output summaries."

"The program I am assigned to requires output summaries 1-14, 16, 17, 20, 26-28, 30, 36AF, 104, and 106."

Analysis

"Only for validating MEA data until the LSA process catches up."

"ORLA (optimal repair level analysis) depot activation related data, LLTI (long lead-time items), support equipment recommendations."

"SERDs, CFE (contractor furnished equipment), notices, etc."

"Failure summaries, SERDs, RIW (reliability improvement warranty) test plan, RLA (repair level analysis), LSAR."

"Reliability and maintainability data."

"For trade studies, ECP (engineering change proposal) evaluations, etc."

"Yes, piece part FMECA (failure modes, effects, and criticality analysis) eliminated from R&M and put on B-sheets."

"Support equipment procured as a capability [meeting system level RM&A (reliability, maintainability, and availability) requirements]."

Other

"To determine contractor's accomplishment of SOW (statement of work) tasking."

"Currently use LSA plan and have access to all LSA data through data accession list."

"Use LSC (logistics support cost)."

"All DSARC (Defense System Acquisition Review Council)/AFSARC (Air Force System Acquisition Review Council) decision-making criteria/data."

"LSA plan."

"CRT (cathode ray tube) access to entire LSA data base."

"SERDs, technical orders, spares, facilities."

"First data delivery was our sample in April 1983. Next will be August '83."

"As a general information source."

Have you received any LSA training?

a. Yes, formal training. Please specify course name, date, and organization that provided the training:_____

b. Yes, informal training. Please specify the office or office symbol that provided this training:_____

c. No, and I don't think any training would be beneficial.

d. No, but I do think appropriate training would be beneficial in performing my current duties.

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.	3	5		8
b.		6	2	8
a&b.		6		6
c.	2	2	1	5
d.	5	15	3	23

Observations: The small number of individuals who have received formal LSA training was another indication that LSA is still considered to be relatively new in the field of systems acquisition. In fact, the results indicate

only three primary sources of formal training: Army Logistics Management Center (ALMC), Air Force Institute of Technology (AFIT), and Mantech Corporation. Almost half of the respondents indicated they had not received training, but believed such training would be beneficial. In fact, this response was prevalent in all categories; logistics managers, logistics monitors, and engineering monitors. The types of training received and the quality of this training (regarding items which were either "overemphasized" or "underemphasized") are addressed after the next three questions.

Were any specific areas relating to LSA "overemphasized" during your training?

a. Yes. Please specify:_____
_____
b. No
c. Not Applicable

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.		5		5
b.	3	12	2	17
c.	7	17	4	28

Were any specific areas relating to LSA "underemphasized" during your training?

a. Yes. Please specify:_____
_____
b. No
c. Not Applicable

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.	1	10	1	12
b.	2	7	1	10
c.	7	17	4	28

If you received LSA training, do you believe it helped you understand the LSA process better?

a. Yes
b. No
c. Not Applicable

	Logistics Managers	Logistics Monitors	Engineering Monitors	Total
a.	2	15	2	19
b.	1	1		2
c.	7	17	4	28
No Response:				1

Observations: The great majority of personnel who had received training believed no instructional areas were overemphasized, but almost half believed some areas required more emphasis. An analysis denoting the type of training received and areas of overemphasis and underemphasis is provided in Table 1. (Note: Two individuals indicated that they received training but did not specify who provided this training.)

Research Question 2

The responses to the survey questions for research question 2 were used in an attempt to determine whether the LSA process was being effectively applied on current ASD acquisitions. The findings are organized according to the

TABLE 1

ANALYSIS OF TRAINING

Type of Training Received		Did the training help you understand LSA better?	Areas of Overemphasis	Areas of Underemphasis
Formal	Informal			
"Limited training in Log 224 and Log 225 at AFIT."		Yes	None	None
"Part of (AFIT) system 100 course."		No	None	"How to tailor."
"Continuing education courses at AFIT."	"PTA and overview briefing, contractors."	Yes	"The output products are greatly over-exaggerated. The key to using LSA is in reviewing the input products."	"The role that the information on the 'H' sheet has in the provisioning process."
"Army presentation and AFIT."	"AFALD/PTA"	Yes	None	None

TABLE 1 (Continued)

Type of Training Received		Did the training help you understand LSA better?	Areas of Overemphasis	Areas of Underemphasis
Formal	Informal			
"One week training at Fort Lee, Virginia - how to fill out data sheets."	"On-the-job training reviewing military standards."	Yes	None	"Cost trade study analysis."
"Introduction to Logistics Support Management, 7-18 Mar 83, ALMC, Fort Lee, Virginia."		Yes	None	None
"Army LSA Record Course, 16 Jan 81 (extension from Fort Lee)."		No	"LSA record sheet documentation."	"Importance of the process and uses for LSA information by the government."
"Mantech International"		Yes	None	"The new LSA MIL-STD."
"Mantech Corporation, 1981"		Yes	"Background information on MIL-STD-1388 and DARCOM Pamphlet 750-16."	None

TABLE 1 (Continued)

Type of Training Received		Did the training help you understand LSA better?	Areas of Overemphasis	Areas of Underemphasis
Formal	Informal			
"LSA Workshop; 18-20 May 1983, SOLE (Society of Logistics Engineers) Space Cost Chapter; Melbourne, Florida."	"AFALD/PTA and HQ AFLC/IGIC (Inspector General, Materiel Management Inspection Division)."	Yes	"It is extremely difficult to monitor or direct contractor's performance of LSA tasks because there is not usually a one to one correspondence between the LSA tasks and contract deliverable data items."	"The need to have the LSA data sheets as a contract deliverable data item via computer tape, hard copy, or a computer terminal and line printer was not emphasized. Also, LSA data sheet card D information which should be recorded on computer tape is required to develop the Logistics Composite Model (LCOM)."
"On-the-job, AFALD/PTA."	"Self-training, AFALD/PTA."	Yes	None	"Output products."
"ILS and System Acquisition (ALMC), AFALD."		Yes	None	None

TABLE 1 (Continued)

Type of Training Received		Did the training help you understand LSA better?	Areas of Overemphasis	Areas of Underemphasis
Formal	Informal			
	"AFALD/PTA"	Yes	None	"In the R&D environment, LSA is nothing more than 'system engineering'. This point must be emphasized to 'sell' LSA to the R&D community."
	"AFALD/PTA"	Yes	None	None
	"AFALD/PTA"	Yes	None	None
	"AFALD/PTA"	No	None	"Tailoring for small programs."
	"AFALD/PTA and OJT (on-the-job training)"	Yes	"Initial training should begin with a general overview of the system, followed by in-depth training in the input records and tailoring procedures."	"Tailoring the LSA requirements for the program, conducting LSAR audits."

TABLE 1 (Continued)

Type of Training Received		Did the training help you understand LSA better?	Areas of Overemphasis	Areas of Underemphasis
Formal	Informal			
	"AFALD/PTA and in-house."	Yes	None	"Detailed applications and to what level should LSA be done on support equipment to identify supportability for support equipment itself."
	"MIL-STD-1388, Guide for Supportability, on-going tailoring effort."	N/A	None	None
	"AFGL (Trainer Systems) ILS"	Yes	None	None

contractual requirements for LSA/LSAR: The LSA plan, the need for tailoring, the LSA design review, the documentation (LSAR) and the terminology used in applicable defense contract Statements of Work.

The findings were categorized by program to facilitate answering this question. A total of 28 programs from the system program offices within ASD were analyzed. Major, less-than-major, and modification acquisitions were included. Each survey question is listed first, followed by the available responses to the questions. Next to each available response is the number of respondents that answered accordingly. After the responses, general observations denoting the significance of the particular survey question are provided, along with applicable comments provided by the respondents.

Which acquisition phase is the system you are primarily associated with in at present, and approximately when did the system enter this phase?

a.	Conceptual	5
b.	Demonstration/Validation	2
c.	Full Scale Development (FSD)	12
d.	Production/Deployment	7
	Concurrent	2

Observations: Programs in all phases of the acquisition cycle were surveyed because the LSA process should be applied throughout the acquisition cycle. The concurrent response was given by two programs which were concur-

rently in FSD and production at the time of the survey.

LSA Plan

Was there a requirement for the prime contractor to prepare a Logistics Support Analysis (LSA) plan in the initial Request For Proposal (RFP) prior to the conceptual phase of the acquisition process?

a. Yes	12
b. No	12
c. Not Sure	4

If the system you are primarily associated with was beyond the conceptual phase at the time you became aware of LSA requirements, was the contractor required to prepare an LSA plan in subsequent phases?

a. Yes	12
b. No	4
c. Not Applicable	12

Observations: These two questions were combined because the responses indicated whether an LSA plan was required from the contractor. The LSA plan denotes the level of effort proposed by the contractor. It is noted that 24 of the 28 programs did have contractual requirements for an LSA plan.

Were any guidelines established to determine the "acceptability" of the LSA plan prepared by the contractor?

a. Yes 17
b. No 7
c. Not Applicable 4

Observations: The results show that 17 of the 24 programs with an LSA plan had the means to determine the acceptability of the LSA plan. It is very important to evaluate the LSA plan because almost all of the LSA process is accomplished by the contractor.

LSA Tailoring

Did any of the Statements of Work (SOWs) applicable to this system denote specific LSA tasks and subtasks?

a. Yes 22
b. No 6

Was there any "tailoring" completed on these tasks/ subtasks as recommended in MIL-STD-1388A, Weapon System and Equipment Support Analysis?

a. Yes 21
b. No 1

Did the Contractor Data Requirements List (CDRL) include specific Data Item Descriptions (DIDs) which encompass LSA/LSAR information?

a. Yes 22
b. No 0

Observations: These three questions were combined because the respondents answered the second and third only

if the answer to the first was affirmative. These questions are important since some tailoring should be done on each contract; that is, no two contracts are exactly alike. If tailoring was not accomplished, there is a possibility of redundancy and contractual requirements that are inflated beyond actual needs. Therefore, each program should denote only those tasks and subtasks in the SOW that are needed and only those DIDs that are actually required.

Design Review

Did the SOW denote an appropriate requirement to establish and document design review procedures as described in Task 103 (Program and Design Reviews) of MIL-STD-1388A?

a.	Yes	13
b.	No	14
	Not Sure	1

Did the SOW list specify points in time for the accomplishment of these contractor design reviews?

a.	Yes	17
b.	No	7
	Not Sure	4

Did the SOW establish agendas and general guidelines to be followed during these contractor design reviews?

a.	Yes	11
b.	No	14
	Not Sure	3

Observations: These three questions were combined because they all refer to the requirement for reviews of LSA implementation during execution of the contract. Responses to the second and third questions were used to analyze the specificity of the contractual requirements. It is interesting to note that while only 13 programs had requirements on contract for reviews of LSA, 17 programs had specified points in time for accomplishment of the reviews. The answers to these questions were dysfunctional and indicated that some respondents did not fully understand the initial question regarding the contractual requirements for a review.

Contractual Requirements for LSAR

Did any of the SOWs prepared for this system prescribe procedures for the creation and maintenance of Logistics Support Analysis Records (LSAR)?

a.	Yes	19
b.	No	6
c.	Not Applicable	3

Did the SOW outline the LSAR control numbering system to be used?

a.	Yes	9
b.	No	10
	Not Applicable	9

Is there a schedule for LSAR data entry?

a.	Yes	13
b.	No	6
	Not Applicable	9

Is there a procedure for ensuring the validity of the data entered?

a.	Yes	16
b.	No	3
	Not Applicable	9

Observations: These four questions were combined because the last three were answered only if the respondent answered affirmatively that the SOW required the creation of LSAR. There was no requirement for LSAR at all on six contracts as noted. In addition, the respondents for three other programs believed they were too early in the acquisition process to have a requirement for LSAR. This left 19 programs with contractual requirements for LSAR. The survey question on the LSAR control numbering systems tried to determine the amount of flexibility allowed the contractor and whether the contract denoted a previously established numbering system for standardization between programs. The responses show that the programs were split almost evenly with 9 of the 19 requiring an established LSAR numbering system. The survey question regarding scheduling the input of LSA data was designed to determine if LSA was documented in the LSAR as influencing design as opposed to merely being used as a historical data base. The responses denoted that a schedule was required 68% of the time. The LSA data

must be validated to ensure the usability of the LSAR. The answers showed that the data was being validated on 84% of the programs.

Contractual Terminology

Does the SOW stipulate that LSA will coincide with the system design effort?

a. Yes	20
b. No	8

Does the SOW indicate that supportability is a key driver during system design?

a. Yes	23
b. No	5

Observations: The purpose of LSA is to influence the system design effort by ensuring supportability is a key driver. These questions determined whether this was actually specified in the contract. The results show that this is true most of the time (71% on the first question and 82% on the second question).

Research Question 3

The findings for research question 3 were designed to assist in determining whether the LSA review process was effective within those ASD program offices in the survey. The survey questions were therefore directed at finding out what preparations were taken beforehand; whether the pro-

ceedings were documented; if follow-up actions were taken; and whether the respondents thought the LSA review(s) were successful.

The results for these survey questions were also categorized by program just as the results for research question 2. The same format which lists the question first, the available responses, and the answers by the respondents, was therefore used. Observations are provided at the bottom of each table to note the importance of each question.

LSA Review Requirements

Have any reviews of the applicability and acceptability of the contractor LSA implementation been accomplished subsequent to the review of the contractor's initial proposal?

a.	Yes	15
b.	No	13

Provide the dates these reviews were performed (month/year). (Note: These dates were translated into frequency data, with the numbers indicating the number of programs that have held the review noted.)

a.	1st Review	15
b.	2nd Review	10
c.	3rd Review	6
d.	4th Review	6

Observations: These two questions were combined because the second question was answered only if a "yes"

was provided as a response to the first question. Results showed that 54% of the programs had accomplished LSA reviews. The second survey question displayed the fact that reviews occur iteratively throughout the contract to ensure contractor compliance.

Indicate why reviews have not been accomplished.

a.	Too early in the acquisition process	9
b.	Lack of guidance	
c.	Insufficient TDY funds	
d.	None of the above	4

Briefly describe the methodology used to review contractor LSA implementation.

Comments made	0
No comments	13

Observations: These survey questions were designed to analyze those programs that had not accomplished reviews of LSA contractor implementation. The first survey question attempted to determine why reviews had not been accomplished. The second survey question was designed to determine how program personnel were ensuring contractor compliance if reviews were not accomplished. The results show that nine programs were too near the beginning of the acquisition process to have accomplished LSA reviews, while the remaining four were in the process of adding LSA to the contract and therefore were not ready for a review either.

The purpose of the second question was to find out how contractor compliance was being reviewed if reviews were not accomplished. Since reviews were not required for any of the 13 contracts, no responses were received for the second question.

LSA Review Preparation

Which of the following LSA review guidance items were prepared or acquired prior to the reviews? (Circle as many as applicable.)

a.	Checklist(s)	1
b.	Review meeting agenda	3
c.	Contractor questionnaire	0
d.	Other	1
e.	None of the above	2
	"a" and "b"	6
	"b" and "d"	1
	"a", "b", and "c"	1

Observations: This survey question determined what preparations were made prior to the LSA review. It is best to enter an LSA review well-prepared because it is critical to the analysis of contractor compliance with the LSA contractual terms. Eighty-seven percent did have at least one kind of preparation, with 53% having two or more. The other preparatory means mentioned were the development of a systems procedures manual, training sessions for the LSA team, and prior review of initial LSAR input sheets.

Would any of the above LSA review guidance items have been helpful?

a.	Checklist(s)	1
b.	Review meeting agenda	0
c.	Contractor questionnaire	2
d.	None of the above	0
	"a" and "b"	5
	"a" and "c"	2
	"b" and "c"	1
	"a", "b", and "c"	4

Observations: This survey question determined whether preparations would have been helpful prior to the LSA reviews--in particular, whether the three preparatory means listed would have been helpful. One hundred percent of the responses indicated a need for one or more of the three preparatory items.

LSA Review Documentation

How were the results of these LSA reviews documented?

a.	Meeting minutes	4
b.	Trip report	1
c.	Other	0
d.	No documentation completed	2
	Both "a" and "b"	6
	Both "a" and "c"	1
	"a", "b", and "c"	1

Observations: Documenting the results of reviews ensures problems have been identified and facilitates preparation for the subsequent reviews. Eighty-seven percent of the programs did document the LSA review in one form or another. Two of the programs used additional means of documentation besides meeting minutes and trip reports. One program used meeting minutes and, in addition, sent a

magnetic tape of the LSAR to the Logistic Composite Model (LCOM) office and air vehicle contractor. The other program used a combination of meeting minutes, a trip report, and formal action checklists for both the contractor and the government to document the LSA review.

Review Follow-Up

Was there a follow-up accomplished on items discussed during the LSA reviews?

a. Yes	14
b. No	1

Observations: Follow-up is necessary to ensure problems identified during the review have been corrected. Ninety-three percent of the programs did complete follow-up actions.

Review Effectiveness

Were the LSA reviews successful?

a. Yes	12
b. No	3

Observations: Eighty percent of the respondents felt that the LSA reviews were successful. The first of the three exceptions stated that the contractor had no previous experience in LSA and therefore severely underestimated the work to be done. As a result, there was little to review. The second noted that the review had been completed too late in the acquisition process to determine if

LSA was actually accomplishing program goals. The third response noted that the reviewers had insufficient knowledge of LSAR to complete a successful review. In other words, the contractor had to educate the reviewers as to the purpose of the LSAR.

Do you believe this questionnaire is more applicable to someone else in this System Program Office?

a.	Yes	15
b.	No	26
	No Answer	9

Observations: This survey question was not part of research question 3. Its purpose was to direct the researchers to the personnel who were involved the most in the application of LSA in the system program office. Therefore, the results only assisted in expanding the population for this effort.

Research Question 4

Survey respondents were asked to review 11 "lessons learned" extracted from Integrated Logistic Support Lessons Learned Reports compiled by the DARCOM Materiel Readiness Support Activity to determine if knowledge of these LSA problems would be helpful to personnel in the ASD acquisition community. Each of the 11 lessons learned was followed by two multiple choice questions designed to confirm the relative applicability of the lesson learned to the weapon

systems the respondents were primarily associated with and the helpfulness of each lesson learned to assist the respondents in avoiding similar problems in the future. The actual lessons learned narratives are presented in the survey instrument (Appendix). The actual survey questions and possible responses are presented below to facilitate comprehension of the research results.

> Please indicate how applicable this lesson learned is to the system acquisition you are currently associated with:
>
> a. Not applicable
> b. Minimally applicable
> c. Somewhat applicable
> d. Mostly applicable
> e. Entirely applicable
>
> Please indicate how helpful this lesson learned would be in helping you avoid similar problems:
>
> a. Not helpful
> b. Minimally helpful
> c. Somewhat helpful
> d. Mostly helpful
> e. Entirely helpful

To analyze the findings, the researchers reviewed the responses to the survey questions three ways. First, the findings were reviewed for each individual lesson learned; survey findings are summarized in Table 2. Results are also categorized according to the duties performed by the participants as presented in the findings for research question 1: logistics managers, logistics monitors, and engineering monitors. These results are displayed in histograms in Figure 2. Finally, the results are

analyzed in the aggregate to accommodate determining the overall degree of applicability/helpfulness of the lessons learned. Totals are listed both in Table 2 and Figure 2. The number of responses varied for different lessons learned because some of the individuals included in this survey chose not to respond to one or more of the lessons learned. Apparently, they either did not understand the content or did not take the time to read each lesson learned.

The survey results presented in Table 2 indicate that over half of the respondents felt that 10 of the 11 lessons learned were at least somewhat applicable and somewhat helpful. This result was the same for the different categories of personnel, since over half of the responses by the logistics managers, logistics monitors, and engineering monitors, respectively, revealed that the lessons learned were at least somewhat applicable and somewhat helpful as summarized in both Table 2 and Figure 2.

TABLE 2

ANALYSIS OF FINDINGS FOR EACH INDIVIDUAL LESSON LEARNED

	Applicability					
Lesson Learned	Not Applicable	Minimally Applicable	Somewhat Applicable	Mostly Applicable	Entirely Applicable	Total Responses
1	10	8	4	7	17	46
2	10	9	5	8	11	43
3	13	9	7	4	11	44
4	13	9	7	7	8	44
5	18	8	7	7	4	44
6	12	5	10	10	8	45
7	8	4	9	11	13	45
8	8	4	9	15	9	45
9	13	6	7	7	11	44
10	13	9	10	7	6	45
11	15	7	8	5	9	44
Totals	133	78	83	88	107	489

TABLE 2 (Continued)

Lesson Learned	Helpfulness: Not Helpful	Minimally Helpful	Somewhat Helpful	Mostly Helpful	Entirely Helpful	Total Responses
1	4	7	12	7	15	45
2	8	6	11	8	11	44
3	12	11	7	6	9	45
4	8	7	10	11	8	44
5	15	8	9	7	5	44
6	10	7	10	10	8	45
7	7	3	11	13	11	45
8	7	5	10	15	8	45
9	8	7	15	5	9	44
10	9	7	15	5	8	44
11	11	7	12	5	9	44
Totals	99	75	122	92	101	489

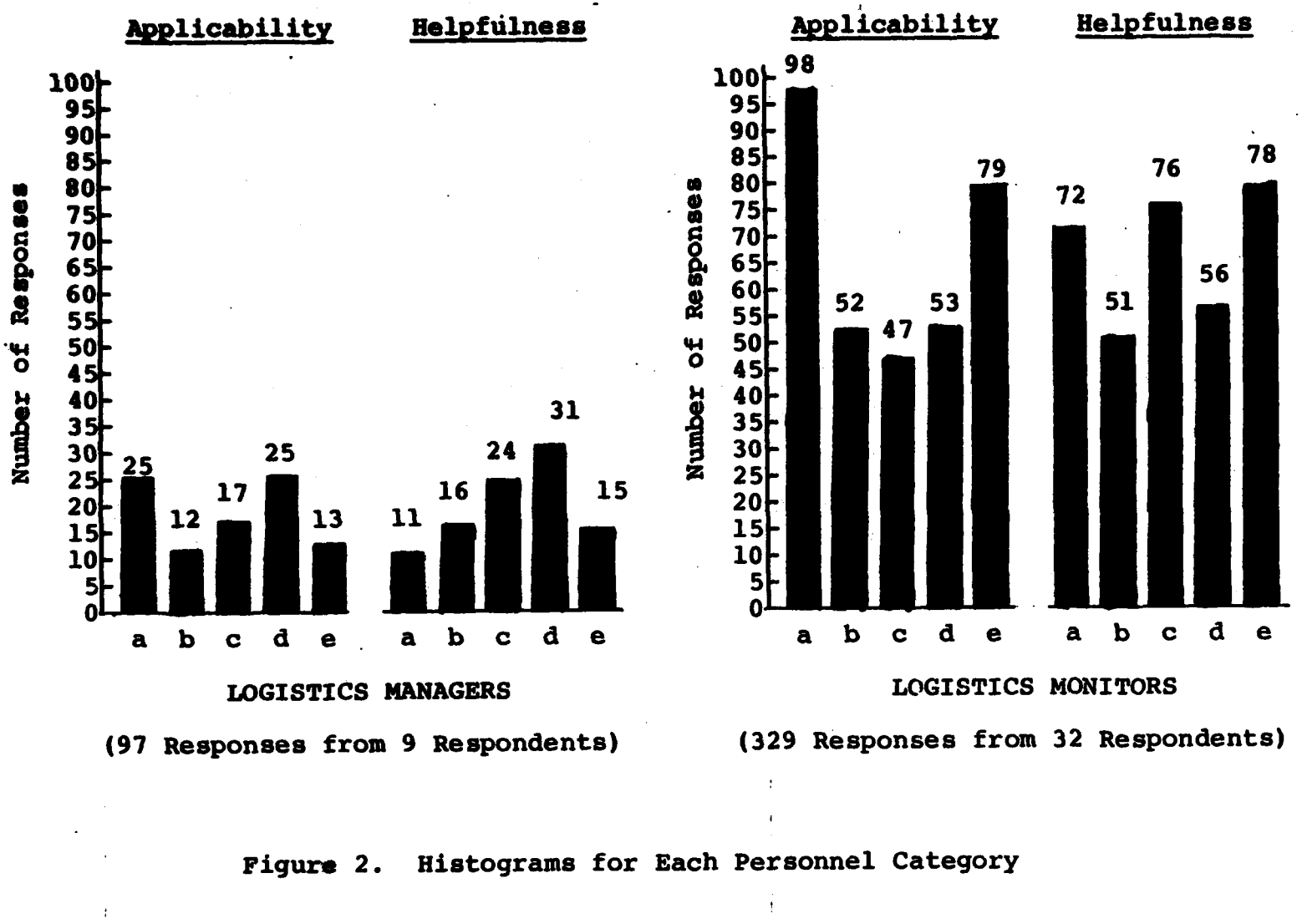
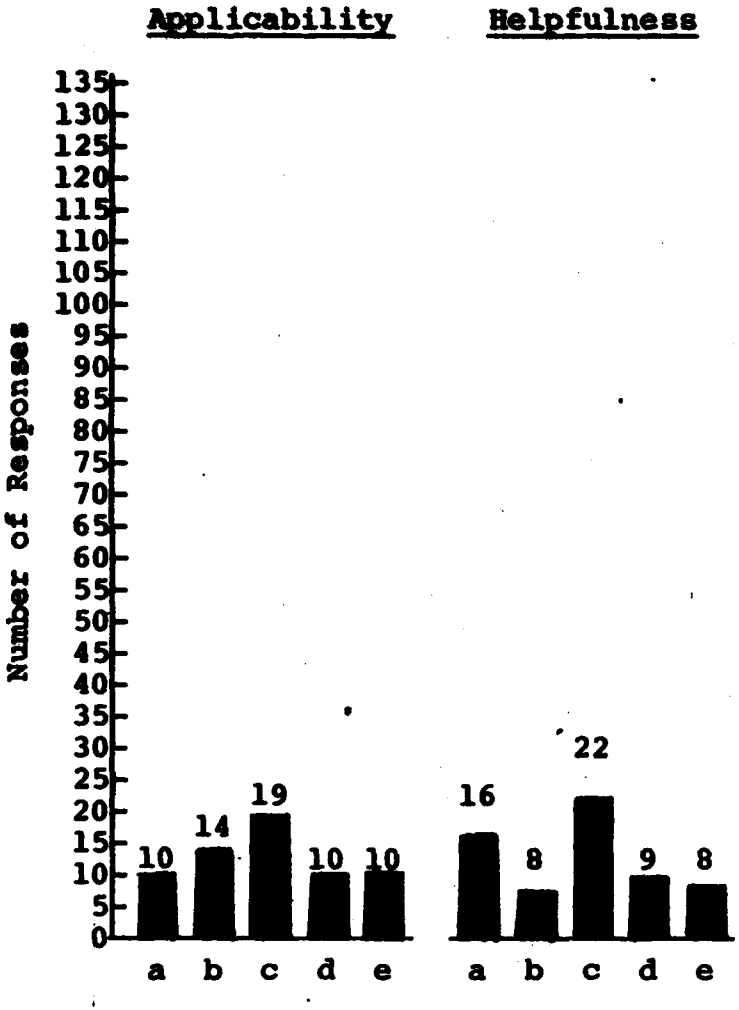
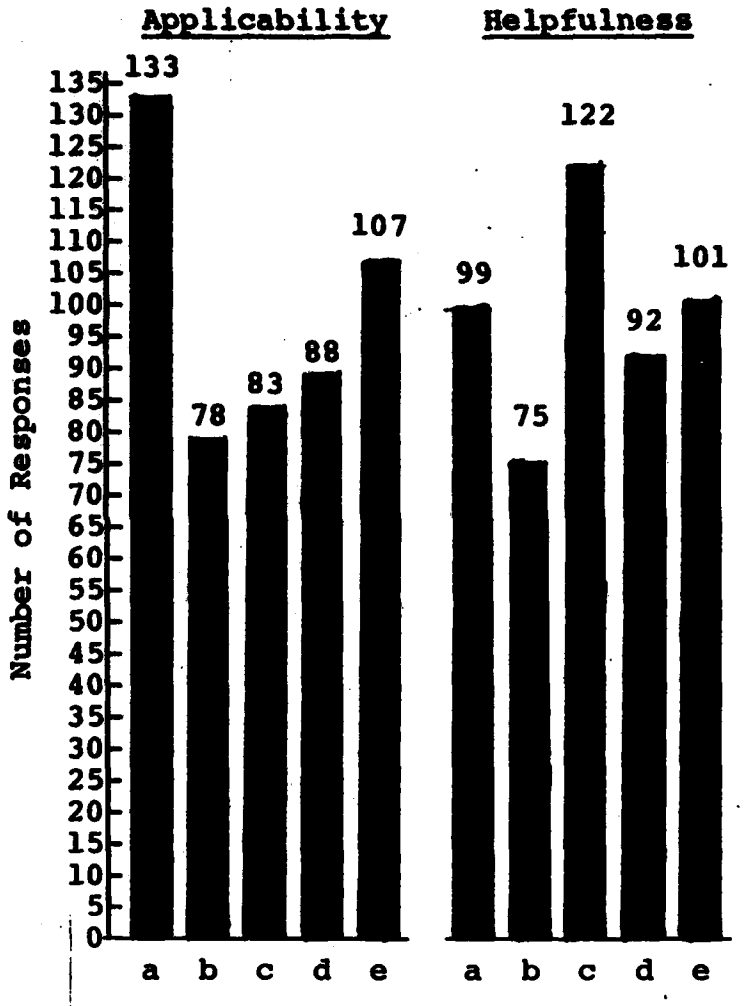


Figure 2. Histograms for Each Personnel Category



ENGINEERING MONITORS

(63 Responses from 6 Respondents)



OVERALL RESULTS

(489 Responses from 47 Respondents)

Figure 2. (Continued)

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Research Question 1

Are the necessary personnel in ASD program offices familiar with the LSA process to ensure this process is being utilized?

Based on the responses obtained, the necessary personnel (logistics managers, logistics monitors, and engineering monitors) in program offices were at least fairly knowledgeable of the LSA process to the extent that it was being utilized at the time of the survey.

Discussion

Although almost half (44%) of the individuals spend less than 10 hours per month performing duties associated with LSA; the majority of respondents were familiar with LSA documents, believed they were at least fairly knowledgeable of LSA policies and procedures, and used LSA outputs. They also believed the current LSA process can be improved, which is probably true for almost any new logistics tool.

Surprisingly, over half of the logistics managers (6 of 10) spent 10 hours or more per month devoted to LSA functions. This is an indication that LSA is getting some

degree of support from supervisory personnel. A large majority of the respondents (82%) were familiar with MIL-STD-1388A; again, including 9 of the 10 logistics managers. Fewer personnel (64%) were familiar with the Guide for Supportability Analysis and Supportability Analysis Record, but a possible explanation is that the military standard is older (November 1981) than the Guide (July 1982). Over 90% of the respondents believed they were at least fairly knowledgeable of LSA (including 8 of the 10 logistics managers) which is encouraging, but less than half of the 50 individuals contacted believed the current LSA process was effective.

Since 27 of the 50 respondents took the time to provide suggested improvements to the LSA process, it appears LSA is still suffering "growing pains". Yet, many of these suggested improvements really denote a lack of understanding regarding LSA policies and procedures, along with the benefits which can be derived when LSA is effectively applied. For example, an interview with one individual indicated LSA required too much paperwork to effectively identify Air Force technical order (AFTO) requirements, while discussions with another person revealed that LSA had saved his staff over 1,000 man-hours in identifying AFTO requirements. The prevailing suggestions offered proposed that (1) more specific instructions (or some type of education/training) be provided describing how to tailor LSA, and (2) LSA not

be applied for less-than-major programs. Perhaps if more instructions or education were provided, the latter issue would not be a problem.

Over two thirds of the respondents used some type of LSA output documentation or information to perform their current duties in spite of the overall opinion that the current LSA process was not effective. Again, this is another indication that LSA is being used, but the individuals using it apparently do not feel totally comfortable with LSA in its current form. The types of output documentation used were extremely varied, thus indicating that LSA has some degree of versatility.

Perhaps the most important conclusion that can be drawn from research question 1 results is that program office personnel apparently require some type of initial or follow-on LSA training or education. Of the 28 individuals who had not received either formal or informal training, 23 (82%) believed that appropriate training would be beneficial in performing their current duties. Even the individuals who had received some type of training were not totally satisfied with the content or methodology of instruction. However, there were no prevalent trends as to which training areas were overemphasized and which were underemphasized. The most frequently addressed item where individuals indicated additional training was required involved tailoring (three responses). Nevertheless, the

overall results clearly indicate that the training respondents had received was beneficial: 19 of the 22 individuals who had received some type of training believed it helped them understand the LSA process better.

Research Question 2

Is the LSA process applied effectively on current Air Force acquisition programs within ASD?

Based on responses obtained which addressed this research question, the LSA process was applied effectively on most of the programs reviewed in this research effort.

Discussion

The researchers addressed five contractual requirements for LSA/LSAR to assess whether the LSA process was being applied. The LSA plan is the first of these requirements needed to effectively apply LSA. This plan is important because the contractor accomplishes almost all of the LSA process and should explain to the government the proposed level of effort for LSA. This requirement was not a problem on the programs reviewed, as 24 of 28 programs did have an LSA plan on contract. However, this study also notes that 7 of the 24 did not have the means to evaluate the LSA plan, i.e., program office personnel could have difficulties assuring that LSA efforts contracted for were actually accomplished.

The second of the requirements is the need for tailoring to ensure the program receives an appropriate level of effort void of redundancy and inflated contractual requirements, both of which can be costly. Tailoring was not a problem because 22 of the 28 programs denoted tailoring of LSA in the Statement of Work.

The third requirement is the establishment of LSA reviews with the contractor to ensure compliance with contractual terms. LSA reviews appeared to be a problem as less than half of the respondents indicated the requirement for reviews in the contract. More emphasis is needed in this area to ensure LSA continues to be applied effectively throughout the duration of an acquisition contract.

The fourth requirement addresses procedures for the creation and maintenance of LSA documentation (LSAR). LSAR ensures that a data base is established to record the analyses performed during the design. However, the contract must specify that the LSAR will be documented as proof that LSA will influence design. Apparently, LSAR as a design tool is not a large problem within the ASD programs reviewed since 13 of the 19 programs had an appropriate contractual requirement; however, this issue cannot be emphasized enough because using LSAR as a historical document (as is the case when LSA is documented after the fact) diminishes its usefulness considerably. Naturally, a means to ensure the validity of the LSA data generated must exist. This

issue was not a problem since 16 of the 19 programs with LSAR requirements did have the means to ensure the validity of the data entered.

The fifth requirement is the assurance that terminology of the contract stipulates that LSA will coincide with the system design effort and that supportability is a key driver during system design. This is the overall purpose of LSA and, therefore, should be addressed appropriately in the contract. This also was not a problem, as 20 of the 28 programs contracts did stipulate that LSA would coincide with the system design process, and the respondents for 23 of the 28 programs indicated that the contract stated that supportability was a key driver during system design.

Research Question 3

How effective is the LSA review process within ASD?

Based on the answers provided by the respondents, most of those ASD programs surveyed that had accomplished an LSA review were doing it effectively.

Discussion

To perform an effective LSA review, the Guide notes that actions must be taken beforehand to prepare for the review and afterwards to ensure follow-up actions are taken when necessary. The respondents indicated that checklists, review meeting agenda, contractor questionnaires, and a

system procedures manual were completed beforehand to prepare for an LSA review. Additionally, some acquisition programs used training sessions for the LSA review team and examined various LSAR input sheets prior to the review. In fact, only two of the 15 programs did not take some sort of preparatory action. When asked if checklists, review meeting agenda, or contractor questionnaires would have been helpful, all of the respondents answered affirmatively.

Actions taken after LSA reviews were accomplished included documenting the LSA review meeting proceedings and taking follow-up action(s) on any problem(s) discovered. The respondents noted that the proceedings were documented for 13 of the 15 programs in the form of meeting minutes, trip reports, formal action checklists, and/or copies of the LSAR tapes. In addition, 14 of the 15 programs performed follow-up actions on problems discovered during the reviews. The last question asked the respondent's opinion as to whether the LSA reviews were successful. Twelve of the 15 respondents did feel the reviews were successful.

Research Question 4

Will the availability of lessons learned packages from the Army help ASD program office personnel avoid similar LSA/LSAR problems?

Based on the responses received concerning the Army lessons learned package, the availability of lessons

learned packages from the Army would help ASD program office personnel avoid similar LSA/LSAR problems.

Discussion

The findings for this research question showed that there were many individuals that felt the lessons learned package from the Army was applicable to the program they were primarily associated with and that the lessons learned helped them so they could avoid similar problems in the future. Twenty-nine of the 47 respondents indicated that knowledge of the lessons learned was at least somewhat helpful. Although there were some individuals that felt otherwise, this does not detract from the fact that many did feel the package was applicable/helpful.

Recommendations

1. A definite need exists for the Air Force to establish an LSA/LSAR training program available to all program office logisticians and systems engineers based on the fact that 23 of 50 respondents to this effort with LSA/LSAR responsibilities indicated a lack of needed training. Additionally, 12 of the 22 respondents that had received training felt that some areas had been underemphasized. Further research to determine the most appropriate content and method of LSA training applicable to program office personnel would complement this effort considerably.

2. AFALD/PTA should consider increasing distribution of LSA Activity Newsletter Reports since only 18 of 50 respondents indicated they had obtained them. In addition, it is recommended that AFALD/PTA include applicable lessons learned from other services as an attachment to the newsletter.

Future benefits derived from the inclusion of these lessons learned may not be measurable, but this small effort could possibly pay big dividends if mistakes made by the Army can be avoided by individuals within ASD program offices.

3. When further research is accomplished investigating LSA, the relationship between benefits derived from LSA and the associated costs of the LSA process should be explored. Although the subject of cost was not specifically addressed in this effort, many respondents voiced considerable concern about the price defense contractors attach to LSA, especially the LSAR. In fact, some individuals believed that the savings LSA can render would never exceed the cost of having LSA tasks in a defense contract. Even the individuals whose duties are solely devoted to LSA indicated that, currently, no adequate methodology exists to determine how much LSA should really cost for any given acquisition.

4. Since LSA functions are primarily accomplished by defense contractors, research similar to this effort should

be performed to determine the effectiveness of LSA implementation within contractor organizations. With minor modifications, the interview survey instrument (Appendix A) could be used to answer the four basic research questions from defense contractors' viewpoint. Additionally, discovering the contractors' general attitudes toward LSA and difficulties encountered during LSA implementation could provide additional insight into the question of how to use this tool effectively.

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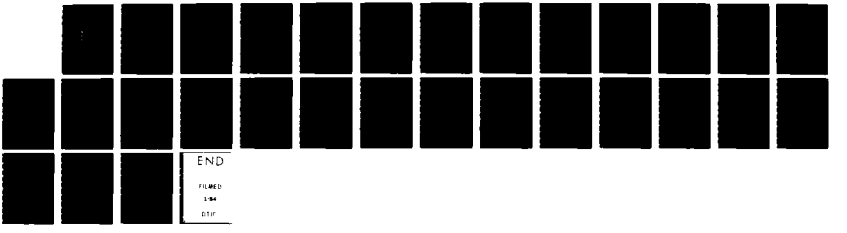

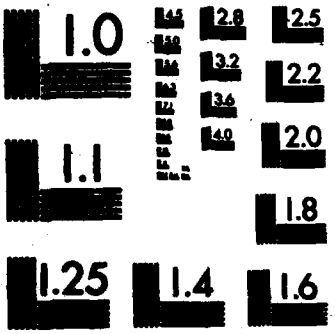

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APPENDIX

APPENDIX

LOGISTICS SUPPORT ANALYSIS SURVEY

LOGISTICS SUPPORT ANALYSIS SURVEY

Research Question 1

1. What is your present grade?

   a. O-1 to O-3
   b. O-4 to O-5
   c. O-6 or higher
   d. GS-9 to GS-12
   e. GS-13 to GS-14
   f. GS-15 or higher
   g. Other _____

2. Please provide your current position title and office symbol.

   _____

3. How long have you worked in this position?

   a. Less than six months
   b. Six months to one year
   c. One year to two years
   d. More than two years

4. How long have you worked in systems acquisition?

   a. Less than six months
   b. Six months to one year
   c. One year to two years
   d. More than two years

5. Into which of the following general areas would you classify your overall experience in systems acquisition?

   a. Logistics Management
   b. Program Management
   c. Systems Engineering
   d. All of the above
   e. Both "a" and "b"
   f. Both "b" and "c"
   g. Both "a" and "c"
   h. Other(s) _____

6. Approximately how many manhours per month do you spend performing duties associated with Logistics Support Analysis (LSA)?

   a. Less than 10
   b. 10 to 20
   c. 20 to 30
   d. 30 or more

7. Would you consider your position as the "focal point" for LSA for the system you are primarily associated with?

   a. Yes, my position is the focal point.

   b. The focal point is at a higher level in this office (i.e., first three letters of office symbol are the same).

   c. The focal point is at a lower level in this office (i.e., first four letters of office symbol are the same).

   d. The focal point is in a different office. Please specify the office symbol for that office.

   _____

8. Are you familiar with MIL-STD-1388A, Weapon System and Equipment Support Analysis?

   a. Yes

   b. No

9. Are you familiar with the "Guide for Supportability Analysis and Supportability Analysis Record" prepared by AFALD/PTA?

   a. Yes

   b. No

10. How would you rate your knowledge of LSA policies and procedures?

   a. I am not knowledgeable of them

   b. I am fairly knowledgeable of them

   c. I am very knowledgeable of them

11. Do you think the current LSA process is effective?

   a. Yes

   b. No. Please make recommended improvements:

   _____

   _____

12. In your current position, do you use any LSA output documentation or information provided by the contractor?

   a. Yes. Please specify: _____

   _____

   b. No, I don't need any LSA output documentation or information to perform my current duties.

c. No, but I think LSA output documentation/information would be helpful in performing my current duties.

13. Have you received any LSA training?

a. Yes, formal training. Please specify course name, date, and organization that provided the training:

_____

_____

b. Yes, informal training. Please specify the office or office symbol that provided this training:

_____

_____

c. No, and I don't think any training would be beneficial.

d. No, but I do think appropriate training would be beneficial in performing my current duties.

14. If you received LSA training, do you believe it helped you understand the LSA process better?

a. Yes

b. No

c. Not Applicable

15. Were any specific areas relating to LSA "over-emphasized" during your training?

a. Yes. Please specify: _____

_____

b. No

c. Not Applicable

16. Were any specific areas relating to LSA "under-emphasized" during your training?

a. Yes. Please specify: _____

_____

b. No

c. Not Applicable

17. What would you like to see <u>additionally</u> in the previously mentioned "Guide for Supportability Analysis and Supportability Analysis Record"?

_____

_____

18. Do you receive the AFALD/PTA newsletters?

    a. Yes

    b. No

19. How useful is the information provided in the AFALD/PTA newsletters?

    a. Very useful

    b. Somewhat useful

    c. Not useful

    d. I don't receive the newsletters

Research Question 2

1. Which acquisition phase is the system you are primarily associated with in at present, and approximately when did the system enter this phase?

Acquisition Phase	Month/Year
a. Conceptual	_____
b. Demonstration/Validation	_____
c. Full-Scale Development	_____
d. Production/Deployment	_____

2. Was there a requirement for the prime contractor to prepare a Logistics Support Analysis (LSA) plan in the initial Request For Proposal (RFP) prior to the conceptual phase of the acquisition process?

   a. Yes

   b. No

   c. Not Sure

3. If the system you are primarily associated with was beyond the conceptual phase at the time you became aware of LSA requirements, was the contractor required to prepare an LSA plan in subsequent phases?

   a. Yes. Please specify the phase: _____

   _____

   b. No

   c. Not Applicable

4. Were any guidelines established to determine the "acceptability" of the LSA plan prepared by the contractor?

   a. Yes

   b. No

5. Did any of the Statements of Work (SOWs) applicable to this system denote specific LSA tasks and subtasks?

   a. Yes (Answer 5.1. and 5.2.)

   b. No (Do not answer 5.1. and 5.2.)

   5.1. Was there any "tailoring" completed on these tasks/subtasks as recommended in MIL-STD-1388A, Weapon System and Equipment Support Analysis?

   a. Yes

   b. No

5.2. Did the Contractor Data Requirements List (CDRL) include specific Data Item Descriptions (DIDs) which encompass LSA/LSAR information?

a. Yes

b. No

6. Did the SOW denote an appropriate requirement to establish and document design review procedures as described in Task 103 (Program and Design Reviews) of MIL-STD-1388A?

a. Yes

b. No

6.1. Did the SOW list specified points in time for the accomplishment of these contractor design reviews?

a. Yes

b. No

6.2. Did the SOW establish agendas and general guidelines to be followed during these contractor design reviews?

a. Yes

b. No

7. Did any of the SOWs prepared for this system prescribe procedures for the creation and maintenance of Logistics Support Analysis Records (LSAR)?

a. Yes (Answer 7.1. to 7.3.)

b. No (Do not answer 7.1. to 7.3.)

c. Not Applicable (Do not answer 7.1. to 7.3.)

7.1. Did the SOW outline the LSAR control numbering system to be used?

a. Yes

b. No

7.2. Is there a schedule for LSAR data entry?

a. Yes

b. No

7.3. Is there a procedure for ensuring the validity of the data entered?

a. Yes

b. No

8. Does the SOW stipulate that LSA will coincide with the system design effort?

   a. Yes

   b. No

9. Does the SOW indicate that supportability is a key driver during system design?

   a. Yes

   b. No

Research Question 3

1. Have any reviews of the applicability and acceptability of the contractor LSA implementation been accomplished subsequent to the review of the contractor's initial proposal?

   a. Yes (Answer 1.1.)

   b. No (Answer 1.2. and 1.3.)

   1.1. Provide the dates these reviews were performed (month/year).

   a. First review: _____

   b. Second review: _____

   c. Third review: _____

   d. Fourth review: _____

   1.2. Indicate why reviews have not been accomplished.

   a. Too early in the acquisition process

   b. Lack of guidance

   c. Insufficient TDY funds

   d. Other. Please specify: _____

   _____

   _____

   1.3. Briefly describe the methodology used to review contractor LSA implementation.

   _____

   _____

   _____

2. Which of the following LSA review guidance items were prepared or acquired prior to the reviews? (Circle as many as applicable.)

   a. Checklist(s)

   b. Review meeting agenda

   c. Contractor questionnaire

   d. Other. Please specify: _____

   _____

   e. None of the above

3. Would any of the above LSA review guidance items have been helpful?

   a. Checklist(s)

   b. Review meeting agenda

   c. Contractor questionnaire

   d. None of the above

4. How were the results of these LSA reviews documented?

   a. Meeting minutes

   b. Trip report

   c. Other. Please specify: _____

   _____

   d. No documentation completed

5. Was there a follow-up accomplished on items discussed during the LSA reviews?

   a. Yes

   b. No

6. Were the LSA reviews successful?

   a. Yes

   b. No. Specify problems: _____

   _____

   _____

7. Do you believe this questionnaire is more applicable to someone else in this System Program Office?

   a. Yes. Please indicate position title and office symbol:

   _____

   b. No

Research Question 4

READ EACH OF THE FOLLOWING LESSONS LEARNED AND ANSWER THE QUESTIONS FOLLOWING EACH, INDICATING THE RELATIVE APPLICABILITY AND HELPFULNESS OF EACH RESPECTIVELY.

1. "TOPIC: Contractual Requirement for Update of the Logistic Support Analysis Record (LSAR)

   LESSON LEARNED: In many systems, the ILS contract should specify that the LSAR will be updated to reflect any changes made to the design or maintenance plan.

   PROBLEM: The LSAR was not updated to reflect changes made to the maintenance plan since the requirement for LSAR updates was not included on the Contract Data Requirement (CDRL) of the production contract.

   DISCUSSION: The Logistic Support Analysis (LSA) for a particular system was performed during the Full Scale Development (FSD) phase and documented in the LSAR. During the production phase a number of maintenance planning decisions were made which resulted in changes to previously established Source, Maintenance and Recoverability (SMR) codes; i.e., a throwaway item recorded as a repairable item. Because no contractual requirement existed to update the LSAR with data resulting from the maintenance planning decision, it became extremely difficult to insure that the entire program was operating under the same maintenance plan. This lack of current data led to such errors as failing to cancel or initiate support equipment development and failure to revise spares orders, etc.

   ACTION TAKEN/APPROPRIATE ACTION: The contract was modified to require LSAR updates during the production phase when changes generated by the government/contractor affected maintenance planning. The responsible Program Management Office (PMO) or readiness/development command must ensure that a data requirement is specified by the CDRL and applicable Data Item Descriptions (DID's) to require the contractor to submit LSAR updates when changes to the maintenance plan occur. The statement of work (SOW) must direct the contractor to update the LSAR and should require the LSA plan to specify how the currency of data will be maintained. Care should be exercised to insure that all activities requiring LSAR summaries are included on the CDRL distribution list. In addi-

tion, on a periodic basis, the government should review the LSAR to insure that it contains the latest information."

1.1. Please indicate how applicable this lesson learned is to the system acquisition you are currently associated with:

a. Not applicable

b. Minimally applicable

c. Somewhat applicable

d. Mostly applicable

e. Entirely applicable

1.2. Please indicate how helpful this lesson learned would be in helping you to avoid similar problems:

a. Not helpful

b. Minimally helpful

c. Somewhat helpful

d. Mostly helpful

e. Entirely helpful

2. "TOPIC: Logistic Support Analysis Record (LSAR) Data Sheet B: Item Reliability (R) and Maintainability (M) Characteristics

LESSON LEARNED: To minimize cost and maximize benefit from the Failure Modes and Equipment Criticality Analysis (FMECA), it is essential that a thorough understanding of the content, relationship and interface between Data Sheet "B" and FMECA be obtained prior to contract award by both Government and contractor personnel. Early knowledge in this area can result in Data Sheet "B" being substituted for a formal FMECA.

PROBLEM: The Data Sheets "B" for the system utilized the FMECA as a basis for completing the failure mode, card B05, block A. A number of LSAR reviews (three) had been completed when it was noted that the failure modes had insufficient detail and in fact the failure symptoms (B05, block B) more realistically outlined the true failure modes. The above situation is a direct result in understanding the FMECA interface with LSA/LSAR intended use/purpose of the FMECA and interpretation of MIL-STD-1629.

DISCUSSION: The situation cited above has resulted in three significant concerns which are briefly stated below:

a. Failure modes are not correctly identified in either range or depth.
b. All failure modes are not subjected to the Reliability Centered Maintenance (RCM) logic.
c. All potential failure modes may not be assigned a task code (corrective maintenance task(s)).

ACTION TAKEN/APPROPRIATE ACTION:

1. This shortcoming was discussed with contractor LSA representative. Problem was immediately recognized and agreement obtained, permitting correction of Data Sheet "B" without impact on schedule and cost.

2. The [material] developer should assure that the following actions are accomplished prior to contract award or provisions for their accomplishment be contained in the contract.

   a. Assure that contractor personnel associated with preparation of FMECA and Data Sheet "B" are provided training in RCM and LSA programs.
   b. FMECA is documented on Data Sheet "B", Item Reliability and Maintainability Characteristics and supplemented as necessary.
   c. Data Sheet "B" is retained in the LSA/LSAR process.
   d. Combine the Army LSA/RCM training course so as to obtain proper understanding and appreciation for both activities."

2.1. Please indicate how applicable this lesson learned is to the system acquisition you are currently associated with:

   a. Not applicable
   b. Minimally applicable
   c. Somewhat applicable
   d. Mostly applicable
   e. Entirely applicable

2.2. Please indicate how helpful this lesson learned would be in helping you to avoid similar problems:

   a. Not helpful
   b. Minimally helpful
   c. Somewhat helpful
   d. Mostly helpful
   e. Entirely helpful

3. "TOPIC: LSA/LSAR and Release of Design Drawings

SYSTEM: Aviation Systems

LESSON LEARNED: LSA/LSAR statements of work should specify that the contractor must submit engineering development drawings on a timely basis so that support requirements can be adequately assessed.

PROBLEM: LSA/LSAR data developed by the contractor and presented to the Government lags the release of the engineering development drawings to the extent that designing for support cannot be effected until the next hardware build cycle.

DISCUSSION: Contractors schedule completion of the LSA effort to be concurrent with delivery of prototype hardware and not concurrent with release of the engineering development drawings. Contractor management refuses to recognize that you cannot design effectively for logistic support if you do not perform the analysis and documentation concurrent with release of the engineering drawings. Conducting the LSA/LSAR with release of the initial drawings is looked at from a contractor viewpoint as unnecessary expenditure of funds. This is true because he knows that the design is going to change as the items are being developed. If the LSA effort was conducted concurrent with the drawing, then support changes could be incorporated in the prototype development cycle prior to delivery of the initial hardware.

APPROPRIATE ACTION: LSA/LSAR statements of work must require contractors to submit their data no later than 60 days after release of the drawings. Also, the ILS manager must assure that appropriate dollars are allocated so that contractors can have this manpower available for the LSA/LSAR effort at the start of each program."

3.1. Please indicate how applicable this lesson learned is to the system acquisition you are currently associated with:

a. Not applicable

b. Minimally applicable

c. Somewhat applicable

d. Mostly applicable

e. Entirely applicable

3.2. Please indicate how helpful this lesson learned would be in helping you to avoid similar problems:

a. Not helpful

b. Minimally helpful

c. Somewhat helpful

d. Mostly helpful

e. Entirely helpful

4. "TOPIC: LSA/LSAR

SYSTEM: Nondevelopmental Item (NDI)

LESSON LEARNED: A detailed data item description (DID) and statement of work are required when contracting for LSA/LSAR.

PROBLEM: The LSA DID called for task analysis to be documented on the LSAR D sheet. The contractor documented the task analysis through GS but did not provide the depot level tasks (which composed the majority of maintenance actions on this system).

DISCUSSION: During a nondevelopmental item acquisition, the contractor "assumed" he would perform depot level maintenance under a separate maintenance contract (as he was doing for foreign military customers). Since the LSA DID and scope of work did not specify the task analysis would be documented for all levels of maintenance, the contractor provided only what he wanted the government to have. The ensueing legal confrontation confirmed the requirement for the contractor to provide the task analysis through depot level maintenance. The contractor provided the depot level task analysis; however, this information was received a year late and resulted in delays in preparation of the DMWR.

APPROPRIATE ACTION: All aspects of the LSA and LSAR must be documented in detail in the statement of work. The exact expectations of the government in the areas of Reliability Centered Maintenance (RCM) task analysis, supply support requirement, and personnel/facilities/support equipment/transportation requirements must be reviewed thoroughly and any misinterpretation of LSA/LSAR requirements resolved early in the LSA process."

4.1. Please indicate how applicable this lesson learned is to the system acquisition you are currently associated with:

a. Not applicable

b. Minimally applicable

c. Somewhat applicable

d. Mostly applicable

e. Entirely applicable

4.2. Please indicate how helpful this lesson learned would be in helping you to avoid similar problems:

a. Not helpful

b. Minimally helpful

c. Somewhat helpful

d. Mostly helpful

e. Entirely helpful

5. "TOPIC: LSA/LSAR During Competitive Contract Evaluation

SYSTEM: Aviation Systems

LESSON LEARNED: In a competitive contract, the government must document desired changes to enhance logistic supportability upon award of contract.

PROBLEM: Prime contractors must be given design flexibility when they are in competition for a major development effort. The Government must review and accept LSA/LSAR data as it is presented so they do not bias the design during source selection.

DISCUSSION: In LSA/LSAR reviews during competition, the Government may discover one of the competing contractors designs for logistic support should be improved. The Government may also find that the other contractor has correctly designed his system. The Government cannot change the first contractor's design because that would provide the other contractor's design to his competition. The Government must record these deficiencies and program funds to implement required changes at the conclusion of the competition phase. In most cases the deficiencies cannot be corrected immediately and must be carried into the next phase of the design, thus compounding the problem and cost to the Government for correcting the design for logistic supportability.

APPROPRIATE ACTION: Planning documents, regulations, and budgets should recognize the design for support

deficiencies during competition and a system should be developed to record and fund these changes prior to revising the engineering drawings for the next phase of the development program."

5.1. Please indicate how applicable this lesson learned is to the system acquisition you are currently associated with:

a. Not applicable

b. Minimally applicable

c. Somewhat applicable

d. Mostly applicable

e. Entirely applicable

5.2. Please indicate how helpful this lesson learned would be in helping you to avoid similar problems:

a. Not helpful

b. Minimally helpful

c. Somewhat helpful

d. Mostly helpful

e. Entirely helpful

6. "TOPIC: Logistic Support Analyses for Publications

SYSTEM: Tracked Vehicles

LESSON LEARNED: The ILS Manager should assure that the LSAR is accurate, timely, and available as publication source data.

PROBLEM: In an accelerated developmental program the contractor has a tendency to prepare LSA data at the same time or after preliminary draft equipment publications. This results in incomplete/faulty LSAR data and publications. Often publication preparation drives the LSAR program instead of the other way around.

DISCUSSION:

1. The ILS/LSA manager in the R&D command or PM office should give LSAR preparation intensive management. He should insist the contractor report problems immediately so they can be resolved promptly.

2. Members of LSAR Review Teams should check closely for efficient, orderly development of LSAR material.

3. Publications personnel should ask for LSAR data when making In-Process Reviews of TM's, to determine the publications are based on actual data.

APPROPRIATE ACTION: Insure that accurate LSA data is timely and available as publication source data."

6.1. Please indicate how applicable this lesson learned is to the system acquisition you are currently associated with:

a. Not applicable

b. Minimally applicable

c. Somewhat applicable

d. Mostly applicable

e. Entirely applicable

6.2. Please indicate how helpful this lesson learned would be in helping you to avoid similar problems:

a. Not helpful

b. Minimally helpful

c. Somewhat helpful

d. Mostly helpful

e. Entirely helpful

7. "TOPIC: Format and Content of LSA Data

LESSON LEARNED: Prior to actual start of work, the material developer should require the contractor to demonstrate a thorough understanding of the contractual requirements as to the format and content of LSA data in the LSAR.

PROBLEM: Although sample LSAR outputs were provided to the contractor at the LSA/LSAR Guidance Conference (30 days after contract award) the contractor's initial submission of LSA data contained errors and omissions. These required correction before the LSAR could be accepted by the government.

DISCUSSION: The first LSAR Review revealed some significant errors and omissions in the LSA data delivered by the contractor. Correction of these problems

involved duplication of much of the contractor's previous effort in preparing several hundred data sheets and required the government to schedule a second review of the same data.

APPROPRIATE ACTION: The post contract award LSA/LSAR Guidance Conference should include the government interpretation of individual data element definitions, specific data element format instructions and definitive output requirements. The contractor should be required to demonstrate an understanding of the guidance provided by preparing initial input data sheet packages that will simulate the process, format, and content for selected components of the system/equipment under development."

7.1. Please indicate how applicable this lesson learned is to the system acquisition you are currently associated with:

a. Not applicable

b. Minimally applicable

c. Somewhat applicable

d. Mostly applicable

e. Entirely applicable

7.2. Please indicate how helpful this lesson learned would be in helping you to avoid similar problems:

a. Not helpful

b. Minimally helpful

c. Somewhat helpful

d. Mostly helpful

e. Entirely helpful

8. "TOPIC: LSA/LSAR Progress

LESSON LEARNED: To realize maximum benefit from the LSA/LSAR, it is important that LSA/LSAR keep pace with the hardware development program. Early government reviews of contractor's LSA/LSAR progress is necessary to insure that LSA is the driver for ILS planning.

PROBLEM: For a particular weapon system development, the LSA/LSAR were completed after the fact. The LSA process had little effect on ILS or design engineering decisions. The LSAR merely documented system support requirements of the final design. After fielding, an intensive effort was required to upgrade the weapon supportability.

DISCUSSION: The Project Manager for this system perceived the LSAR as a purely historical record. He failed to recognize the capability of the LSA/LSAR to provide current data for the ongoing decision making process and, therefore, did not stress their performance. The resulting weapon system imposed an unnecessary logistics burden which required considerable expense and effort to correct.

APPROPRIATE ACTION: Contractor responses to request for proposals should address the envisioned level of effort, flow of data, government-contractor interfaces and planned completion schedule for LSA/LSAR. This plan should be incorporated as part of the awarded contract. Proposed schedules should be reviewed with respect to scheduled completion dates for other system milestones to insure availability of LSA data in a timely manner to meet those scheduled delivery dates. Close monitoring of the contractor's progress in the development of the LSAR is essential as delay in this area directly impacts the completion of many ILS milestones."

8.1. Please indicate how applicable this lesson learned is to the system acquisition you are currently associated with:

a. Not applicable

b. Minimally applicable

c. Somewhat applicable

d. Mostly applicable

e. Entirely applicable

8.2. Please indicate how helpful this lesson learned would be in helping you to avoid similar problems:

a. Not helpful

b. Minimally helpful

c. Somewhat helpful

d. Mostly helpful

e. Entirely helpful

9. "TOPIC: Contracting for LSA/LSAR

LESSON LEARNED: Contract requirements for the delivery of LSA data should reflect the government data requirements indicated on the Contract Data Requirements List (CDRL). Careful consideration of how

individual requirements are to be satisfied via the LSA/LSAR is necessary to insure that the data will be provided in a form and time frame which permits the greatest use of the data to meet other system milestones.

PROBLEM: The original contractual requirements required LSA/LSAR work to be [accomplished] but did not specify that input data work sheets become government property. When the Government wished to utilize the LSAR data base, a new contract was needed since the working data base was not government property. A large additional dollar expenditure was needed.

DISCUSSION: When contracting for a system, the government failed to specify that the LSA/LSAR data base would become property of the Army. Accordingly, the contractor provided LSAR outputs but no additional data or analysis information. That materiel was needed, however, to accomplish additional analyses by the government and to prepare technical publications. The government subsequently had to renegotiate the contract to allow access to the LSA/LSAR data base.

APPROPRIATE ACTION: Contract renegotiation and the accompanying costs may be avoided if all data needs and requirements are identified prior to contract preparation. This requires a thorough coordination of data requirements with all involved materiel readiness commands, materiel development commands, project/product/program managers, and testing organizations."

9.1. Please indicate how applicable this lesson learned is to the system acquisition you are currently associated with:

a. Not applicable

b. Minimally applicable

c. Somewhat applicable

d. Mostly applicable

e. Entirely applicable

9.2. Please indicate how helpful this lesson learned would be in helping you to avoid similar problems:

a. Not helpful

b. Minimally helpful

c. Somewhat helpful

d. Mostly helpful

e. Entirely helpful

10. "TOPIC: Submission of LSAR Data

LESSON LEARNED: Incremental submissions of LSAR data, if required by the overall LSAR planning, should be closely coordinated with all MRC's involved.

PROBLEM: Incremental submission of LSAR data in support of the effort may lead to problem areas in coordination of the deliveries and incorporation of the data with previous data submissions.

DISCUSSION: Incremental submission of LSAR provisioning data requires planning and careful management. Coordination among the functional elements within the [MRC's] is necessary to prepare a consolidated position on data requirements, definitions, and delivery schedules. With this consolidated position, clear, concise guidance can be provided to the contractor. The contractor can then prepare and deliver provisioning data that is timely, accurate with regards to the hardware configuration, and will satisfy the needs of the functional elements which use this data.

APPROPRIATE ACTION: Consultation with supporting commands is required by the materiel system proponent to evaluate and plan for the results of incremental LSAR submissions and to reach agreement on the provisioning technical documentation contractual addendum; this is required well in advance of the consolidation of LSAR contractual requirements. Effective planning should be stressed to assure sufficient time is scheduled to allow for incorporation of RPSTL data in TMS and consideration of field acknowledgment response time."

10.1. Please indicate how applicable this lesson learned is to the system acquisition you are currently associated with:

a. Not applicable

b. Minimally applicable

c. Somewhat applicable

d. Mostly applicable

e. Entirely applicable

10.2. Please indicate how helpful this lesson learned would be in helping you to avoid similar problems:

a. Not helpful

b. Minimally helpful

c. Somewhat helpful

d. Mostly helpful

e. Entirely helpful

11. "TOPIC: Contractor-Developed Logistic Support Analysis Record (LSAR) ADP Systems

LESSON LEARNED: Contractor-developed LSAR ADP systems must have the same interface capabilities as the government furnished LSAR ADP system.

PROBLEM: A contractor-developed LSAR ADP system did not have the capabilities needed to adequately interface with the Army's Commodity Command Standard System (CCSS). Consequently, when problems were encountered by the contractor, the design of the contractor-developed system prohibited the use of existing government programs to resolve the problems.

DISCUSSION: In lieu of using the government furnished LSAR ADP system, a program manager (PM) funded the contractor to develop a system that offered the advantages of on-line real time processing. The contractor's ADP system utilized a different LSAR Parts Master File format than the government's ADP system. As a result, existing government programs could not be used to interface the contractor-developed LSAR Parts Master File with the CCSS. This created unforeseen difficulties. For example, following submission of the initial provisioning data to the government's Provisioning Master Record (PMR), a processing problem in the contractor's system caused the loss of significant amounts of data from the contractor-developed LSAR Parts Master File. The data is available in the PMR, and there are government ADP programs that can recreate the information in the government LSAR Parts Master File format. At this time however, the contractor has no automatic capability to convert the government file format into his own file format. The contractor must now either develop a program to do this or manually re-input all the lost data. In the mean time, design change notices [cannot] be processed.

An additional problem is that the contractor's LSAR Parts Master File format precludes the use of an existing government automatic feedback system. This system translates government initiated PMR changes into the proper government LSAR change transactions.

The contractor must develop this capability or continue to process these changes manually.

ACTION TAKEN/APPROPRIATE ACTION: It is strongly recommended that the government furnished LSAR ADP system be used to develop the LSAR Parts Master File for any individual program/project. However, if a contractor-developed LSAR ADP system is being considered, the PM must insure it is validated. Validation must address the input requirements, available output products, and interface capabilities. Additional factors which require consideration prior to selection of a contractor-developed LSAR ADP system include: availability of ADP support for the contractor-developed system; government data review capabilities (i.e., hardcopy input data sheets versus output summaries); and training requirements for government personnel."

11.1. Please indicate how applicable this lesson learned is to the system acquisition you are currently associated with:

a. Not applicable

b. Minimally applicable

c. Somewhat applicable

d. Mostly appliable

e. Entirely applicable

11.2. Please indicate how helpful this lesson learned would be in helping you to avoid similar problems:

a. Not helpful

b. Minimally helpful

c. Somewhat helpful

d. Mostly helpful

e. Entirely helpful

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